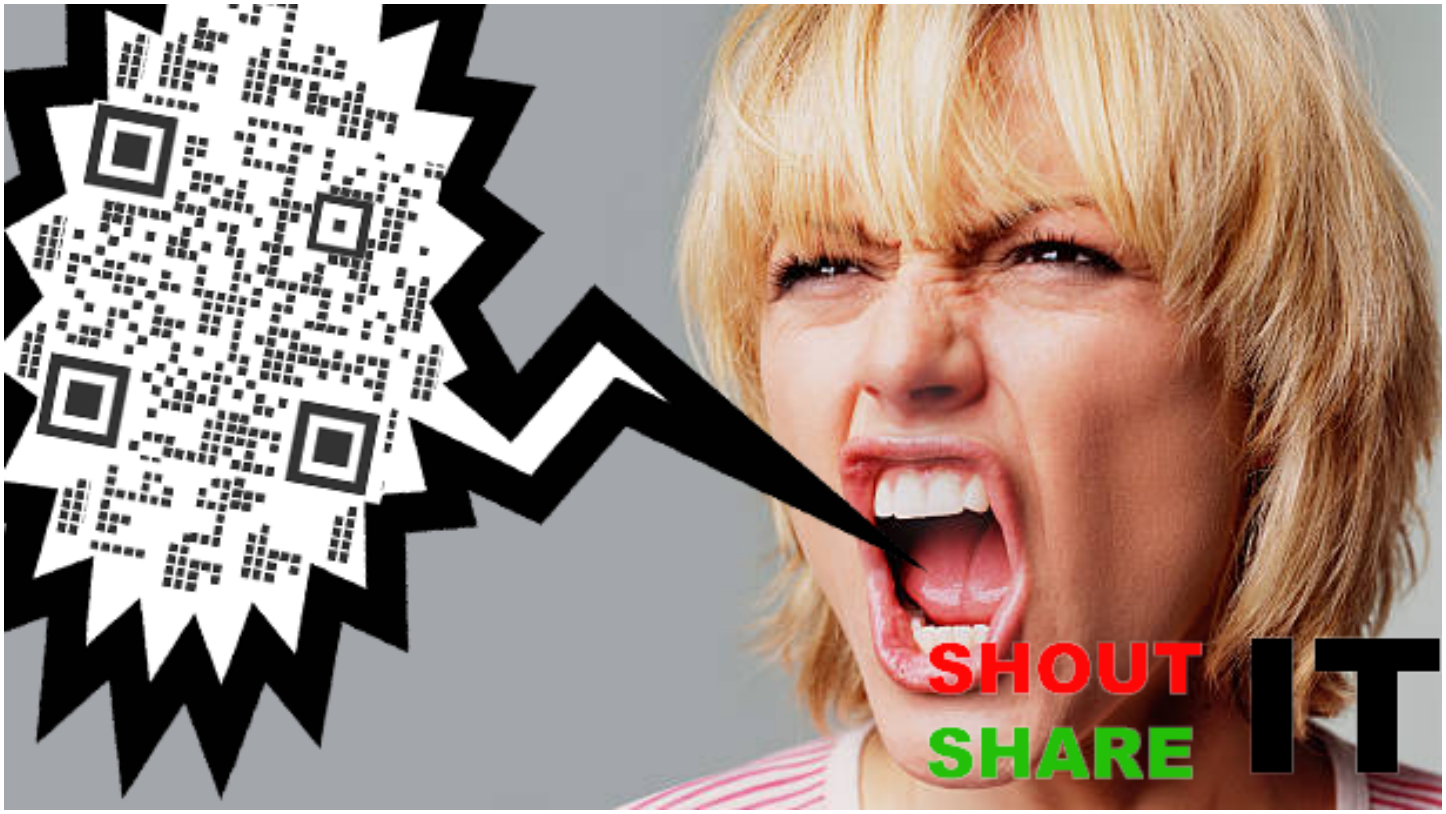
BIENNIAL REPORT

OF THE

BOARD OF HORTICULTURE

OF THE

STATE OF OREGON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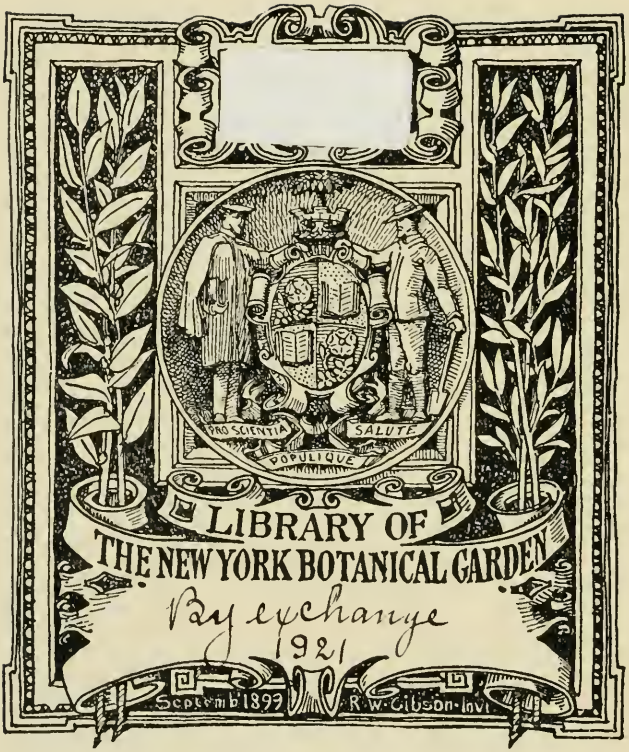
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1921
September 1899
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State Board of

Salem, O

Dear Sirs:-

Our li

by your Board,

for 1913. We s

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Thanki

Rec'd U.S. Rep. o

CAPITOL BUILDING, SALEM, OREGON

"ALIS VOLAT PROPRIIS"

SIXTEENTH BIENNIAL REPORT

OF THE

BOARD OF HORTICULTURE

TO THE

THIRTY-FIRST LEGISLATIVE ASSEMBLY

REGULAR SESSION

OF THE

STATE OF OREGON

1921

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SALEM, OREGON:
STATE PRINTING DEPARTMENT
1921

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First District

Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook Counties

Second District

Lincoln, Marion, Polk, Benton, Linn and Lane Counties

Third District

Douglas, Jackson, Klamath, Josephine, Coos, Curry and Lake Counties

Fourth District

Morrow, Wasco, Gilliam, Hood River, Crook, Sherman, Wheeler, Jefferson and Deschutes Counties

Fifth District

Umatilla, Union, Baker, Wallowa, Malheur, Grant and Harney Counties

COUNTY INSPECTORS

Baker County, F. M. Dimon.
Benton County, vacant.
Clackamas County, O. E. Freytag, Oregon City.
Clatsop County, Chas. S. Dow, Astoria.
Columbia County, A. L. Morris, Warren.
Coos County, vacant.
Curry County, vacant.
Douglas County, E. C. Armstrong, Roseburg.
Gilliam County, T. C. Mobley, Olex.
Grant County, vacant.
Harney County, vacant.
Hood River County, F. W. Angus, Frank Stanton, Hood River.
Jackson County, E. R. Oatman, H. T. Panky, C. C. Cate, Deputy, Medford.
Josephine County, J. B. Rees, Grants Pass.
Klamath County, Sam Beal, Klamath Falls.
Lake County, vacant; O. B. Hardy, deputy commissioner.
Lane County, C. E. Stewart, Cottage Grove.
Lincoln County, S. G. Irwin, Newport.
Linn County, D. W. Rumbaugh, W. A. Bodine, Albany.
Malheur County, A. Gramse, Ontario.
Marion County, S. W. Van Trump, Salem.
Morrow County, W. E. Wallbridge, Heppner.
Multnomah County, Charles N. Walker, 152 Courthouse, Portland.
Polk County, J. S. Parker, Dallas.
Sherman County, vacant.
Tillamook County, Ray C. Jones, Tillamook.
Umatilla County, W. P. Hopson, Milton.
Union County, A. C. Filman, Union.
Wallowa County, H. V. Meade, Orenco.
Washington County, vacant.
Wasco County, vacant.
Wheeler County, vacant.
Yamhill County, vacant.

REPORT OF CHAS. A. PARK, PRESIDENT AND COMMISSIONER OF THE SECOND DISTRICT

To the Honorable State Board of Horticulture:

I herewith submit my report for the term ending December, 1920, as Commissioner of the Second Horticultural District of the State of Oregon, which district comprises the counties of Lane, Linn, Marion, Lincoln, Benton and Polk, a section of the Northern part of the Willamette Valley together with a portion of the country lying between the Willamette Valley and the Pacific Coast. This district is a part of the mistland of Oregon, where one of the greatest economic assets is the rain that falls upon us in fine mists—the mists that make possible the wonderful crops of hay, grain and fruits—mists that cover our mountains with forest trees so that we have more standing timber than any other State in the Union—mists that produce such beautiful coloring to our landscape—mists that veil the mountain from the lofty crown down the graceful sweep to the valley below, adorned as a bride awaiting the coming of her bridgeroom, symbolic of opportunity inviting worthy, sturdy, industrious and thrifty families to come in and make beautiful, prosperous and contented homes.

During the past two years the fruit growers have passed through a period of unprecedented conditions, a period in which we were in war. Then followed the close of the war and the readjustment of economic activities. During the period of war the prices of fruit soared high. The growers never before enjoyed such prices. Now that readjustment is at hand, prices of every commodity are on the decline. At present there is little or no market for any farm product. The losses due to shrinkage in prices fall upon all handlers of fruit products, but it seems to fall most heavily upon the farmer. Nevertheless the farmer is not discouraged or dismayed. He is bending his shoulder to the storm and pressing forward. People must eat and the farmer must produce.

The county fruit inspection in this district has been hampered during the past two years. Lane and Marion counties are the only counties in this district which have regular county fruit inspectors. At present it is necessary to use the inspectors of these counties to do the necessary inspection work in their neighboring counties. Thus far we have been able to do the work in a way, but not in a satisfactory way.

The marketing of fruit is one of the principal problems the producer has to meet. Fortunately many new plants for taking care of the fruit products have been built during the past two years, which feature has given the grower a market near at hand. Several of these plants or factories have conducted a nationwide advertising campaign and have thus placed the name of Oregon fruit products in every household in the United States. There have been many cooperative plants which were organized to care for small localities. Some of these were successful and of others we are sorry we cannot make such good report. Nevertheless the idea has come to stay and with the successful experience of the fruit growers of California as a guide many of the growers of Oregon have organized a cooperative association to care for and market the products they produce. The conception of this cooperative organization is large enough to take in the whole State of Oregon and to handle all the products produced by growers. Very encouraging progress has been made during its first years' operation and we trust that we may make flattering reports concerning its accomplishment in the near future.

The last Legislature made it incumbent upon the County Assessors to list the acreage planted to the various kinds of fruits and nuts. The report for the year 1920 of the State Tax Commission of Oregon gives us the following tabulation:

MAY 23 1921

Counties	Apples	Cherries	Peaches	Pears	Prunes	Walnuts	Logans
Clackamas	1,692	105	67	67	1,179	151	133
Benton	1,410	15	63	168	871	74	92
Columbia	516	17	.....	13	17	3	5
Douglas	3,564	159	223	928	5,964	112	118
Jackson	5,695	61	524	8,051	112	33	8
Josephine	404	5	137	863	10	.....	.....
Lane	2,338	592	169	540	1,816	256	153
Linn	390	41	36	48	1,010	50	130
Marion	2,548	497	272	393	8,701	611	3,446
Multnomah	305	198	23	78	79	17	103
Polk	1,827	701	126	216	6,875	383	350
Washington	1,519	136	35	157	2,478	507	211
Yamhill	1,888	627	91	164	7,204	1,993	493
	24,096	3,154	1,766	11,686	36,313	4,190	5,242

As President of the Oregon State Board of Horticulture and Quarantine Officer, I have to report that the Western Plant Quarantine Board was organized at Riverside, California, in May, 1919, with a membership composed of the plant quarantine officers of the eleven Western states, the territory of Hawaii, the province of British Columbia, and the Northern district of Lower California.

The purpose of the organization is to protect the Western states, provinces and territories as a whole against the introduction of plant pests and diseases not established West of the Rocky Mountains by promoting uniformity of action in the promulgation and enforcement of plant quarantine regulations and to protect each other through close association enabling a better understanding of the quarantine problems in each state. The officers of the Board are: Mr. G. H. Hecke, Director of Agriculture of California, Chairman; Mr. Chas. A. Park, President of State Board of Horticulture of Oregon, Vice-Chairman; and Mr. Harold R. Hagen, State Inspector of Crops and Pest Commission of Utah, Secretary. All of whom were elected for a period of two years.

The first annual meeting of the Board was held at Salt Lake City, Utah, in May, 1920, with all of the members present except the territory of Hawaii. This meeting was marked by much enthusiasm and harmony. The personal acquaintance and touch made possible by these meetings is doing much to solve our problems efficiently and harmoniously.

Alfalfa Weevil Quarantine

We have modified our Alfalfa Weevil quarantine against Idaho so as to include the whole State of Idaho and a small portion of the Eastern part of Malheur County which borders on Idaho. At this point the alfalfa weevil have secured a lodgment by being carried across the Snake River into Oregon. We hope to delay and retard the progress of this dreaded pest so that with control methods its damage may be reduced to a minimum. The quarantine withholds much hay from the market and results in serious loss to the growers. To render the hay and its products safe for transportation to clean fields is a problem confronting the Board. The manufacture of alfalfa meal from the hay promises to help solve the problem to a certain extent. It appears that it is doubtful if any weevil in any stage of development can survive the milling process, but much care must be used to prevent the product from becoming infested after being milled. Under proper precautions we hope to be able to move alfalfa meal.

Another means of moving this hay would be to submit it to vacuum fumigation, using the bisulphide of carbon as the fumigate. By this method it is possible to kill the weevils in the product after it is packed and ready for delivery to the buyer. If the cost of this method of fumigation is not prohibitive it will offer an efficient way of handling the infested hay. I hope that a plant of sufficient capacity may be established at some convenient point.

Strawberry Root Weevil

Within the past month the State of California has placed upon us a quarantine regulation concerning the strawberry root weevil. An investigation disclosed the fact that this pest exists in the Northern part of our State. To consider this matter, a public meeting was called at Portland on December 17. There were about fifty strawberry plant growers present to meet Mr. Lee A. Strong, a representative of the California Quarantine Department. The subject was carefully considered with the result that a survey of the State will be made to ascertain the extent of the distribution of the strawberry root weevil and that no plants will be allowed to be shipped or sold from any strawberry plantings in the State where there is any doubt about the same being free from the weevil. This regulation will not only apply to our shipments to California, but will apply to any other shipments of strawberry plants.

Potato Tuber Moth Quarantine

A public hearing to consider a quarantine regulation covering the movement of potatoes from California to Oregon was held in Salem, on December 14. There were present at this meeting the following representatives: Department of Agriculture of California, Potato Shippers of San Francisco, Commission Merchants of Portland, Members of Oregon State Board of Horticulture, and many local potato growers. Everybody present was given an opportunity to discuss the subject, after which the matter was taken under advisement until the details of a quarantine regulation can be considered by the proper representatives of the Western Plant Quarantine Board, as what will apply to Oregon will probably apply to the other Western States. The purpose of the quarantine will be to prevent the shipment of such potatoes from California that carry the potato tuber moth in any stage of development. If there are portions of California that are free from the tuber moth, we will try to arrange that potatoes from such territory can be shipped under due care and caution. We feel sure that when potatoes have been subjected to the fumes of bisulphide of carbon in a vacuum fumigator that the tuber moth in any stage of development is killed, so potatoes that have been thus treated should be allowed to come into Oregon. We will work out the details covering these conditions before any potatoes are shipped from California into Oregon.

By our quarantine measures we are endeavoring to confine the plant pests and diseases to areas already infested and thus hold back and retard the advance to new fields, while control methods can be put into operation.

CHAS. A. PARK,

Horticultural Commissioner, Second District.

Salem, Oregon, December 31, 1920.

REPORT OF HOMER C. ATWELL, COMMISSIONER OF THE FIRST DISTRICT

To the Honorable State Board of Horticulture:

The past year will long be remembered by Oregon horticulturists for the excessively cold snap of December last, said to have been the coldest weather the state has experienced in forty years. Had it not been for the deep snow that lay on the ground, during the severe weather; and the fact that, at that time of the year, trees are usually more nearly dormant than during any other part of the year, the results would have been disastrous. As it was, great damage was done on the lower levels, not only to fruit trees but to deciduous forest trees as well. The unprecedented severity of the freeze is indicated by the fact that native oak trees, supposed to be over one hundred years old, were

100-ACRE APPLE AND PEAR ORCHARD—WALLACE, SALEM, OREGON.

killed to the snow line. On the low lands many walnut, pear and apple plantations, which had withstood forty years of climatic vicissitude, were very badly decimated. On the hills, however, the permanent injury was, I think the event will disclose, negligible, although to the consequent lowered vitality of the trees is attributed the unusually late drop of surplus prunes. It is likely that, with thorough tillage and judicious pruning, in the near future, this injury will prove to be of only temporary effect. In the light of the experience afforded by this freeze, it behooves the prospective planter to look well to drainage conditions. Trees will not ripen their wood sufficiently to withstand the hard winter weather we occasionally have, if the water table stands too near the surface, late in the season.

As a natural consequence of the freeze, the walnut and apple crops on lowland situations were greatly reduced. Loganberries, on the lower levels, wherever they had been trellised, were also killed to the snow line. Fortunately for the currant berry crop, a large acreage of vines had been left untrellised to promote tipping. Blackcaps seem to have suffered but little, and strawberries, being protected by the snow, were unscathed.

Prune men experienced another setback, due to a succession of rains which continued, almost uninterruptedly, throughout the entire drying season, causing great loss from cracking, and unwillingness of help to pick under the climatic conditions. It is probable that fully one-third of the crop was lost on account of these handicaps. The crop which was saved was very unsatisfactory as to size and quality. The set of prunes in the spring had been phenomenal. Instead of shedding the excess in June or early July, as the Italian usually does, the entire crop hung on until into August. The result was an unusually small size for those that were left on the trees. Moreover, development of sugar late in the season was hindered through lack of sunshine. This condition not only contributed to the smallness of size, but produced a fruit lacking the superb quality for which the Oregon prune is justly famous. Prices also have been disappointing to most growers. This was the year when many growers concluded they would not sell early for fear some neighbor who held off might get a better price later. Those who sold in July, on the theory that it is always best to accept a good price when it is offered, have no reason to regret their foresight.

The two leading prune counties in the first district are Washington and Yamhill. In Washington County there are 936 acres in bearing, and 419 acres not bearing; total 1,355 acres. In Yamhill County there are 2,217 acres in bearing, and 1,410 acres not bearing; total 3,627 acres. Acreage of prunes in Multnomah, Columbia, Clatsop and Tillamook counties is of small extent. Clackamas County plantings are not large in the aggregate. Apples, as a commercial proposition, cut but a small figure in all these counties. The loganberry, however, is enticing planters in all the counties.

There are thirteen fruit and vegetable canneries in my district, distributed by counties as follows: Tillamook one, Clatsop two, Multnomah three, Clackamas one, Washington two, and Yamhill four. All are in private hands. None of the farmers cooperative canneries, started with such high hopes ten years ago, are now controlled by the grower. This is history repeating itself. It takes, as a rule, twenty years for the taste of these experiments to disappear from the public mouth, and the memory of them from the public mind. It is to be hoped, nevertheless, that some wisdom born of experience may attend the recrudesence of the cooperative idea ten years hence.

Conditions as to orchard diseases and pests are fair. The intelligent grower, who is in the fruit growing business for revenue, understands that systematic spraying is a necessary factor of success, and acts accordingly, with satisfying results. The horticultural inspector of Multnomah county, appointed by the commissioner of this district, is doing a great amount of work in inspection of nursery stock and potatoes coming into the state through its principal gateway.

The same is true of the inspector of Clatsop County, at Astoria. The work of these officials, along this line, is done in cooperation with the state inspector appointed by this board. All these men are performing a great service to the horticultural interests of the state. The general farmer is also benefitted by their labor, as may be seen from the large number of shipments of potatoes from California which are inspected (and often returned) by them for the dreaded tuber moth. It is gratifying to be able to record the appreciation of merchants and commission men, for the work done by our board, as evidenced by their hearty cooperation with our inspectors, notably in Portland and Astoria.

HOMER C. ATWELL,
Horticultural Commissioner, First District.

Forest Grove, Oregon, December 31, 1920.

REPORT OF A. C. ALLEN, COMMISSIONER OF THE THIRD DISTRICT

To the Honorable State Board of Horticulture:

I hereby submit my report as Commissioner of the Third District.

The Third District, comprising the counties of Jackson, Josephine, Douglas, Coos, Curry, Klamath and Lake, embraces a wide range of territory and for the most part not easily accessible by rail. In every county are sufficient horticultural and agricultural activities to warrant a much greater supervision than the funds available will permit. Being situated at the southernmost boundary of the state, it has been incumbent upon the writer to watch particularly for diseases which might be imported from California. This is particularly true in the matter of potatoes, for certain districts of California are badly infested with the tuber moth, which is a real and dangerous menace to the state of Oregon.

Under the quarantine now in effect the State Board of Horticulture is making drastic efforts to prevent the importation of infested tubers into the state. To date the writer does not know of any infested potatoes having been grown within the boundaries of Oregon and it is to be hoped that we can so safeguard ourselves as to prevent this terrible pest from getting a hold here.

Comparatively few of the potato growers of the state, and certainly hardly any of the citizens, begin to realize just what this means to Oregon. The fruit growers realize what damage can be done by the codling moth—they have seen its ravages and have an idea just what it costs them each season to keep their fruit clear of this insect. I need not quote figures as to the loss to fruit growers from this pest, as growers know only too well. Suffice it to say it runs up well over a million dollars. When one stops to consider the items of spray materials, labor, machinery and wormy fruit it is easily seen that one is more likely to underestimate than to overestimate the loss.

To impress upon the minds of those who may read this article I would say: Consider what would happen to the potato crop of the state of Oregon should the tuber moth become as prevalent as the codling moth. To the layman it might occur that this moth can be controlled by sprays the same as the codling moth. But this is a grievous error. Consider the fact that the tuber moth, which works on the tubers, confines his activities to "sapping." In other words, when the eggs, which are very minute, are laid on the plants or tubers, they soon hatch into very small worms. These immediately bury themselves in the stalks, leaves or tubers and are thus protected against any spray. This is especially true where the larvae are hatched upon the tubers. These being underground it can be readily seen how impossible it would be to reach them even if they should remain on the outside of the skin, which they do not.

In an experiment which we made in Jackson County, we took two tubers containing, as far as we could see, four worms. These tubers were placed in

a jar covered with cloth and a bell jar placed over this so as to guard against any possible chance of the escape of a moth. Within a few weeks there was hatched from these two tubers something like 300 worms and moths. This merely serves to show at what a terrific rate they multiply.

Realizing the danger to the potato crop of the state, the State Board of Horticulture has placed a strict quarantine on potatoes from California. After the quarantine first went into effect we condemned and shipped back to California a large number of shipments entering this district. Klamath county was one of the heaviest importers of California potatoes and the writer immediately insisted that a fruit inspector be appointed (the county not having one) to look after the potato shipments. There was considerable opposition to this but the appointment was made. Considerable ill feeling was engendered by the condemnations which followed the appointment of the first inspector but the quarantine was rigidly enforced in spite of this. The result has been most gratifying, for the moth has, to date, been kept out, and Klamath County has rapidly come to the fore in the production of fine potatoes.

Lake County is now also greatly increasing its potato acreage and should become a big factor in that line of agriculture. Most of the lands being planted to potatoes in Lake county have never been planted to them before and, if the growers will use care and proper cultural methods, should become a leader in the production of clean seed. This is true because the ground has not become infected and every effort should be used to plant only good seed and properly treated before planting.

I have gone into this matter at some length merely to impress upon the reader the necessity of safeguarding this industry. The potato crop of the state runs into millions now and will greatly increase in the future so one can readily imagine the enormous loss to us all should the tuber moth gain a foothold in Oregon.

If the State Board of Horticulture should confine its activities solely to this one phase and keep out the tuber moth it is well worth many many times the money appropriated for the entire work of the Board.

The dangers from diseases and insect pests increase as the plantings increase and it is to be hoped that the great importance of the work of the State Board of Horticulture is sufficiently understood so that a sufficient amount be appropriated to enable them to give most or all of their time to their work.

In leaving the matter of potatoes I wish to leave the impression that the potato tuber moth is a present and terrible menace to the state. This is especially true to southern Oregon where the fence between California and Oregon is only an imaginary line very close to valuable agricultural districts.

After a slump of several years the fruit industry is again picking up. In 1919 and 1920 the fruit crops in the Third District have been very satisfactory with generally good prices throughout. All kinds of fruits have brought good prices and there is a generally optimistic tone; in fact, orchard lands in southern Oregon are gaining in value and are coming into good demand. A number of sales, some of them large ones, have taken place showing an increase in confidence in fruit growing.

Diseases have been kept well under control and the inspection has been as efficient as could be expected under the circumstances affecting each county.

Pear blight has entered Douglas county, but the growers have taken prompt hold and the disease is under control. I use the word "control" for I believe that, where blight has once obtained a foothold, it is practically an impossibility to entirely eradicate it. The best that can be hoped for, until immune stock is found, is to control it by efficient inspection and cleanups.

A bad epidemic of blight visited the Rogue River Valley this spring and caused considerable damage in spots. The reason for this appears to be the unusual cool moist weather during blossoming periods and the condition of

ROGUE RIVER VALLEY—MEDFORD IN THE DISTANCE—PARADISE OF SOUTHERN OREGON

some of the trees following the unprecedented freeze last winter. However, inspection service is adequate in this section and the cooperation of the growers is such as to guarantee a good cleanup.

The freeze last winter killed a number of trees throughout the District, but did not cause as much damage as first appearances indicated.

Anthracnose caused considerable trouble the past season in Douglas county, but the growers generally have taken hold and are spraying for its control.

The whole country is still suffering from a lack of water—the annual precipitation being again about half of the normal. Hay crops in unirrigated districts have suffered and even those under irrigation have felt the need of more water.

Taken all in all the horticultural and agricultural industries are assuming a healthy and very optimistic tone.

A. C. ALLEN,
Commissioner for the Third District.

REPORT OF T. A. SAMMIS, JR., COMMISSIONER OF THE FOURTH DISTRICT

To the Honorable State Board of Horticulture:

I respectfully submit my report for the term ending December, 1920, as Commissioner for the Fourth Horticultural District of the State of Oregon, comprising the following counties: Morrow, Wasco, Gilliam, Hood River, Crook, Sherman, Wheeler, Jefferson and Deschutes.

The principal fruit growing counties in this district are Hood River and Wasco.

The extremely low temperatures experienced last winter caused considerable damage to all fruits. The peach crop was practically wiped out and many of the trees on the lower lands were killed. The cherry crop was about fifty per cent normal and many trees were killed, but the extremely high price paid for cherries more than compensated for the small crop. Pears, prunes and apples stood the cold much better but heavy losses of trees were experienced in some sections.

There were a great many fruit trees dug out on account of winter injury that could have been saved. Experience this past season has shown that a tree badly injured and heavily pruned before the leaves come out would die while others with the same injury that were not pruned till the middle of the summer lived and will eventually come back to normal.

The apple crop was below normal with a high percentage of worms caused by the hot weather and conditions favorable to the codling moth.

The blight conditions as a whole are encouraging. There has been a slight extension of the district infected but continuous cutting has held it pretty well in check. The county inspector has been very active in the fight against blight.

The county inspector of Hood River County has been active in combatting anthracnose which has been very bad in some sections of that county.

The commercial growers of fruit in this district comply with the horticultural laws of the state and keep their orchards fairly clean. The small tracts, many of them unoccupied and uncared for and the home orchards and trees in city lots are a source of considerable trouble and should be dealt with more severely.

The Wasco County Fruit Inspector carried on a campaign against the Elm Tree Beetle which made its appearance in The Dalles last year and completely defoliated most of the elm trees in the city. The results of this work can not be determined until next spring when if necessary the work will be carried on.

The prices received by the grape growers have been extremely high and that with a fairly heavy crop has made grape growing very profitable this year.

MOSIER AND HOOD RIVER APPLE DISTRICT—COLUMBIA RIVER—OREGON

The apple market is very unsatisfactory. Increased freight rates is a big factor. Most of the apple buyers lost heavily last year, due to the high prices paid in the early part of the season, the large crop of apples produced, and the lack of consumption due to the sugar shortage in the east which practically eliminated the baked apple, apple pie and sauce. Due to there being no buyers in the field the apple storage houses in the east are about half full while last year at this time storage space was at a premium.

This district is very fortunate in being supplied with a vinegar plant and evaporating plant and a cannery all of which can handle tremendous amounts of fruit.

T. A. SAMMIS, JR.,
Commissioner for the Fourth District.

REPORT OF H. H. WEATHERSPOON, COMMISSIONER OF THE FIFTH DISTRICT

Hon. Chas. A. Park,
President, State Board of Horticulture, Salem, Oregon.

Dear Sir: In addition to reports relative to conditions in the Fifth District, which have been made from time to time, I am pleased to furnish you this report covering general conditions up to the present date.

Owing to the severe winter commencing early in fall of 1919 and running up to about March 1 of the present year, great damage was done to fruit trees of all kinds; also berries.

Reports gathered recently show that there was only about 15 per cent of a berry and cherry crop and taking the fifth district as a whole there was less than 20 per cent of an apple and pear crop, and no peaches at all.

Umatilla County came through with about 30 per cent of an apple crop, while the other counties fell below 10 per cent.

Trees bloomed very late in all counties and fairly well, but there was later a heavy drop occasioned by the vitality of trees being very low due to a very severe past winter.

In certain localities where heavy irrigation was carried on up to late in the season of 1919, there was a severe loss in prune trees, cherry trees, and a slight loss in apple trees, with almost a total loss of peach trees.

In the dry land sections of the Fifth District there was not a great number of apple trees killed outright by the winter, but a severe damage done to the thousands of trees that will not be fully developed until the next season.

Those observing the weakened condition of trees damaged in a few limbs or one entire side of tree, and cut these weakened branches out probably saved a great many of their trees which would have otherwise died the coming year. The prune acreage in Umatilla and Malheur Counties has increased since our last published report about 15 per cent, while there has been a heavy decrease in peaches, a slight decrease in cherries of the sweet varieties, and a heavy decrease in apple acreage.

A fair estimate of the acreage in Baker, Malheur and Union Counties now compared with five years ago would show not over 10 per cent of the acreage we then had in these counties in apples.

In the Milton-Freewater district the apple acreage has been well maintained while in the Stanfield-Hermiston district there has been a falling off which slightly reduces the Umatilla County acreage.

For the year 1919 the entire Fifth District enjoyed a fair yield in all kinds of fruit and while there was no very high prices received for the fruit there was a constant steady demand, and the growers' profits were all that could be expected; in fact, very satisfactory.

GRAND VIEW OF AN APPLE ORCHARD IN BLOOM NEAR ELGIN, EASTERN OREGON.

For the year 1920 we have a light crop with a very dull market with rather low prices; this fact, with the very high prices for boxes, paper, arsenate and other spray materials, as well as labor of a very inferior character, has unquestionably run the cost of production to a figure that will leave the producer nothing for his year's work.

The expected hard turn in financial affairs is gradually taking place and values are shrinking very fast and while every person appeared to be wise to this condition coming, yet few failed to curtail their expenses in a manner that would leave them a profit.

It is to be hoped that every grower will anticipate further shrinkage in general values of every commodity, which no matter how scarce or how short a crop we have for the year 1921 this shrinkage is sure to affect the price of fruits, so it is up to all growers of all kinds of fruits to curtail in matter of expenses for the coming year in order to make a profit. The same is true of all commodities produced on the farm.

The producers of the Pacific Northwest must bear in mind that freight rates have risen 30 cents per box to all Missouri river points as well as intermediate points in the Middle West and 40 cents per box Chicago and New York, as well as all intermediate points in the Middle states, this alone will curtail the use of apples at least 25 per cent as against five years ago and should there be a medium heavy crop in the United States the coming year we may expect a very low price. Hence, it is up to the producers to move very careful in matters of expense for the coming season.

Since the publication of our last biennial report, there has appeared in Malheur County in certain localities alfalfa weevil, which appears to be gradually spreading over Malheur County.

This pest has been working for the past four or five years in Southern Idaho and during the past season many crops were badly damaged and in a few cases totally destroyed. I am pleased to say that the State Board has done all that seemed possible to do by quarantining against Idaho hay coming into the state; also by having a careful survey made of the infected district in Malheur County and quarantining against such districts.

I am pleased to advise that I personally spent one week in that county studying the habits of this pest; also in experimenting to find a method of control.

The Idaho people have determined the fact that spraying meadows with dry arsenate of lead was a good control method; however, only crude methods of spreading the spray was resorted to as there is no machinery up to the present time made for this purpose strictly. I shipped into the county a Niagara No. 2 Dusting machine and tried it out and found it possible to cover 60 to 80 acres per day with two men working with one team. The Niagara people have since that time made some improvements on their machines to suit this kind of work and it is to be hoped that same will meet all requirements. Experiments both in Idaho and Oregon prove beyond a doubt that control methods are possible, but so far as a positive extermination it is very doubtful.

Taking into consideration general conditions in the Fifth District, the fruit grower that knows his business and has taken care of his orchards will suffer less in a general way by the shrinkage in values that is taking place during these reconstruction days than will the diversified agriculturalist. It is to be hoped that any one contemplating the taking out of his orchards to use the lands for other purposes will carefully study the contemplated change and keep in mind the fact that orchard acreage has been steadily decreasing for ten years, while acreages of all other crops promise to increase in the near future very heavily.

Yours very truly,

H. H. WEATHERSPOON.

TYPICAL OPEN CENTER APPLE TREES—J. E. STANSBERY, PORTLAND, OREGON.

REPORT OF J. E. STANSBERY, STATE HORTICULTURE INSPECTOR OF OREGON

To the Honorable State Horticulture Board of Oregon:

I wish to submit the following report from November 1, 1919, to November 1, 1920:

Number of nurseries inspected	22
Number of shipments inspected at American Express Company	685
Number of shipments inspected at Southern Pacific freight	136
Number of shipments inspected at S. P. & S. depot	65
Number of shipments inspected at Pacific Steam Ship Company	35
Number of shipments inspected at McCormick Steam Ship Company	6
Number of pounds of domestic bulbs inspected	2,543
Number of pounds of foreign bulbs inspected	92,000
Total number of pounds	94,543
Number of boxes of California potatoes inspected	23,085
Number of sacks of California potatoes inspected	19,333
Number of shipments of California potatoes without certificates	10
Number of boxes of California potatoes condemned on account of tuber moth and diverted out of the state of Oregon	470
Number of sacks of California potatoes condemned on account of tuber moth and diverted out of the state of Oregon	1,025
Number of trips through different parts of the state to advise growers in horticulture work	15
Number of spraying permits issued	23
Number of currant and gooseberry shipments intercepted on account of white pine blister rust quarantine	4
Number of shipments inspected under Oregon state alfalfa quarantine act	2
Number of states shipping into Oregon	35
Number of foreign countries shipping into Oregon	4
Number of steam ships inspected on arriving from foreign ports	27
Number of ships found to be infected with insect life	5
China soy beans infected with insect life and fumigated at Municipal Dock No. 1, tons	600
Number of cars of grape fruit inspected	5

The above report respectfully submitted by

J. E. STANSBERY,
State Horticulture Inspector of Oregon.

HORTICULTURAL LAWS OF OREGON
1920

(Sections numbered as in Oregon Laws)

THE STATE BOARD OF HORTICULTURE

§ 8844. Board of Horticulture Constituted. There is hereby created a Board of Horticulture, to consist of five members, who shall be appointed by a board consisting of the Governor, Secretary of State and State Treasurer. One member shall be appointed to represent each of the five districts as hereby created, to wit: (1) The first district, which shall comprise the Counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook; (2) the second district, which shall comprise the Counties of Marion, Polk, Benton, Lincoln, Linn and Lane; (3) the third district, which shall comprise the Counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry and Lake; (4) the fourth district, which shall comprise the Counties of Wasco, Sherman, Morrow, Gilliam, Crook, Jefferson and Wheeler; (5) the fifth district which shall comprise the Counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney and Grant. [L. 1899, p. 126, Sec. 1; L. 1891, p. 174, Sec. 1; L. 1895, p. 33, Sec. 1; L. 1899, p. 55, Sec. 1; L. 1915, Chap. 342, Sec. 1; L. O. L. § 5470.]

§ 8845. Residence of Members; Terms of Office; Qualifications. The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith, and shall be engaged in practical horticulture during their incumbency of the office of commissioner. They shall hold office for the term of four years, and until their successors are appointed and have qualified unless removed by the appointing board for failure to perform their duties. Before entering upon his duties each member shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully and impartially discharge the duties of his office, which oath shall be filed in the office of the Secretary of State. [L. O. L., § 5471; L. 1915, Chap. 342, Sec. 2.]

§ 8846. Secretary of Board; His Salary; Oath of Office. Said board shall employ without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $100.00 per month, to be paid in the same manner as other State officers. Before entering upon the duties of his office the secretary shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully and impartially discharge the duties of his office, which said oath shall be filed in the office of the Secretary of State. [L. 1899, p. 127, Sec. 3; L. 1895, p. 34, Sec. 3; B. & C., Sec. 4178; L. 1905, Chap. 222, p. 385, Sec. 6; L. O. L., § 5472; L. 1915, Chap. 342, Sec. 3.]

§ 8847 Each Member May Appoint Deputies—Their Authority. Each member of the State Board of Horticulture shall have authority to appoint, whenever it shall seem to him expedient, a special deputy or deputies, who shall be empowered to discharge any and all the duties prescribed for the members of said board in Section 8860, but the work and authority of said deputies shall be confined to the districts of the commissioners by whom they are respectively appointed. [L. 1903, p. 251, Sec. 1; L. O. L., § 5473.]

§ 8848. Compensation of Deputies. Any deputy appointed under the authority conferred by this act shall receive as compensation for his services $2.00 per day for each day actually spent in the performance of his duties as such deputy, and

all claims for compensation of such deputies shall be audited and paid in the same manner as claims of members of the Board of Horticulture. [L. 1903, p. 251, Sec. 2; L. O. L., § 5474.]

§ 8849. Expenses, How Paid. Any expense, incurred under the provisions of Section 8848 of this act shall be paid out of the appropriation allowed to the State Board of Horticulture. [L. 1903, p. 251, Sec. 3; L. O. L., § 5475.]

§ 8850. Meetings of the Board—Election and Duties of President. The board shall meet on the second Monday of April in each year. Special meetings may be called at other times by three members of the board. At the regular annual meeting of the board each year, or at any special meeting when the office of president is vacant, the board shall elect from among its members a president of the board who shall hold office until the close of the next regular annual meeting unless he ceases to be a member of the board before that time. The president shall preside at all meetings of the board and shall perform all duties imposed upon the commissioner at large of the State Board of Horticulture in Sections 8867 to 8877, inclusive. The president and secretary shall pass upon and approve or reject all claims against the State Board of Horticulture. [L. O. L., § 5476; L. 1915, Chap. 342, Sec. 4.]

§ 8851. Office of Board, Where Held, When Open. The office of the board shall be located at such a place as a majority thereof may determine. It shall be kept open to the public, subject to the rules of the board, every day excepting Sunday and legal holidays, and shall be in charge of the secretary during the absence of the board. [L. 1889, p. 127, Sec. 5; B. & C., Sec. 4180; L. O. L., § 5477.]

§ 8853. Members to Visit Districts, Inspect and Quarantine Orchards. It shall be the duty of the several members of the board, and of the secretary under their direction, to visit their respective districts, and to see that all regulations of the board and all provisions of law to prevent the introduction or spread of fruit pests and diseases of trees or plants injurious to the horticultural interests of the State are enforced. * * * [L. O. L., § 5479.]

§ 8856. Upon a petition of not less than twenty-five resident fruit growers of any county of this State, the county court of said county shall appoint a county inspector whose duty it shall be to inspect orchards, nurseries, trees, shrubs, vines, fruits, vegetables, plants, packing houses, warehouses, storerooms, farms and other places within said county; to visit and inspect the fruit drying and packing plants while such plants are in operation; to enforce such regulations as may be required by the State Board of Horticulture governing the handling, drying and packing of prunes, apples, loganberries, or other fruits evaporated and packed for human consumption, and to enforce all laws of the State relating to such insect pests and such diseases as affect trees, vines, plants of any kind, or fruit or vegetables of any kind and all other horticultural laws, rules and regulations of the State; provided, however, that the inspector so to be appointed shall be recommended and certified to be competent by the commissioner of the State Board of Horticulture of the district in which said county is situated, and said county inspector shall hold his office during the pleasure of said county court.

Upon a petition of not less than twenty-five resident fruit growers of any county of the State, the county court of said county may appoint one or more deputy county inspectors; provided, however that said deputy county inspector or deputy county inspectors, so to be appointed, shall be recommended and certified in the manner provided for the appointment of a county inspector and shall hold office during the pleasure of said county court. Every such deputy county inspector shall have and perform all the powers and duties of a county inspector. The county inspectors and deputy county inspectors and all other persons authorized to enforce the horticultural and inspection laws of Oregon

are authorized and empowered to enter upon or into any premises, land, buildings, inclosures, or other places, for the purpose of inspecting any article which is subject to or may be subject to infestation with any insect injurious to any article which grows upon or in or from the soil by processes of plant growth, or the eggs, larvae of pupae of such insects or with any disease injurious to any such article or articles and for the further purpose of enforcing any of the laws of this State relating to horticultural quarantine, or horticultural inspection or the abatement of horticultural nuisances or any other duties imposed by law upon such inspectors and other persons authorized to enforce the inspection and horticultural laws of Oregon. Every person, firm or corporation doing business as a common carrier within the State of Oregon shall, upon the arrival of any shipment of nursery stock, trees, plants, vines, shrubs, cuttings, or scions, peach pits and other seeds used for growing nursery stock at the station or other place to which the same is consigned, notify the state inspector if there be one in the county in which said shipment has arrived, or if there be no state inspector in said county, shall notify the county inspector of said county and if there be neither state inspector nor county inspector in said county shall notify the commissioner of the State Board of Horticulture of the district in which said county is situated, of the arrival of such shipment and the date and place of arrival, and shall not deliver such shipment to the consignee until authorized to do so by the state inspector, county inspector or commissioner or other officer of the State Board of Horticulture; provided, however, that if such shipment originated within the State of Oregon and the notice be given personally or by telephone or telegraph and inspection has not been commenced within seventy-two hours from the time of sending notice; or if such notice be sent by mail and inspection has not been commenced within as much time more than seventy-two hours as is usually required for a letter to go from the place of arrival of such shipment to the residence of the inspector notified, then such shipment originating in Oregon may be delivered to the consignee. It shall be the duty of the inspector or commissioner receiving notice of the arrival of any shipment of nursery stock, trees, plants, vines, shrubs, cuttings, or scions, to inspect or cause to be inspected said shipment as soon as can be reasonably done without omitting the performance of other official duties equally urgent. Upon the request of any nurseryman or tree dealer doing business within the State of Oregon, the commissioner of the State Board of Horticulture for the district in which the shipping place of business of such nurseryman or tree dealer is located may deputize a suitable person to inspect outgoing shipments from said nurseryman or tree dealer, and said nurseryman or tree dealer shall pay such person so deputized for his services while they are required by such nurseryman or tree dealer. In case the shipping business of any two or more nurserymen and tree dealers is not in the aggregate more than one person can properly inspect and such group shall make satisfactory arrangements for the payment of the person making such inspection, the commissioner may deputize a person to inspect the shipments of all members of such group. No person deputized by a [the] commissioner to inspect outgoing shipments of nursery stock shall make any certificate concerning such shipments which is not true, and no person so deputized shall allow a certificate of inspection given by him to be attached to any tree, shrub, vine, plant, scion, bud or box, crate, bale, bundle or container of the same or of any of them unless he has personally inspected the articles and all of them immediately before signing such certificate, which must be dated in writing at the time it is signed. The commissioner may revoke deputization of any such person at any time if he believes such person is not properly doing his duty. [L. O. L., § 5482; L. 1913, Chap. 174, Sec. 1; L. 1915, Chap. 205; L. 1917, Chap. 235.]

§ 8857. District Commissioners to Instruct and Supervise County Inspectors. It shall be the duty of the state district commissioner to instruct and educate

the county inspectors as to the laws and quarantine regulations of this State, and the rules and regulations of the State Board of Horticulture. The county inspector shall perform his duties under the general supervision of the state district commissioner for said county, to whom he shall make reports in the manner prescribed by the State Board of Horticulture. [L. 1905, Chap. 222, p. 384, Sec. 2; L. O. L., § 5483.]

§ 8858. Compensation of County and Deputy County Inspectors; Report of Time and Expenses. Such county inspector and each deputy county inspector shall be paid for his services by the said county the sum of $3.00 per day and his actual necessary expenses incurred in the performance of his duties. The county inspector and each deputy county inspector shall report monthly to the commissioner of the State Board of Horticulture of the district in which he is employed the time for which he is entitled to pay during the month for which such report is made and a statement of his actual necessary expenses incurred in the performance of his duties as such inspector or deputy inspector with vouchers for such expenses, and the commissioner shall certify the same to the county court of the county before such compensation and expenses shall be paid. The county court of each county shall supply the county inspector and deputy county inspectors with such blanks, stationery and postage as are needed in the performance of their official duties. If it appear to the county court of any county that it will be for the best interest of the people of such county to do so, it may agree to pay, and pay, to its county inspector a larger sum than $3.00 per day for his services. [L. O. L., § 5484; L. 1913, Chap. 174.]

§ 8859. Inspector of Adjacent County May Perform Duties When County Fails to Appoint. If any county for any reason fails to appoint a county inspector as herein provided, then the inspector of any adjacent county may perform such services and his compensation and the necessary expenses incurred in the performance of his duty shall be charged against the county where the service is performed, as if he had been appointed by the county court of said county. [L. 1905, Chap. 222, p. 384, Sec. 4; L. O. L., § 5485.]

§ 8860. Appeals From County Inspectors to District Commissioner. The state district commissioner of horticulture shall hear and promptly decide all appeals from the county inspectors in his district, and his decision shall have full force and effect until set aside by the courts of the State. All appeals from county inspectors to the district commissioners shall be under the form and regulations as prescribed by the State Board of Horticulture. [L. 1905, Chap. 222, p. 384, Sec. 5; L. O. L. § 5486.]

§ 8861. It shall be the duty of the several members of the board and of the state and county inspectors under their direction, whenever they deem it necessary to cause an inspection to be made of any orchards, nurseries, trees, plants, vegetables, vines, or any fruit-packing house, storeroom, salesroom, or any other place within their district, and also of any fruit trees or nursery stock shipped from beyond the limits of this State, and if found infested with any pests, diseases or fungous growth injurious to fruits, plants, trees, vegetables or vines or with their eggs or larvae liable to spread to other places or localities, or of such nature as to be a public danger, they shall notify the owner or owners, or persons in charge of or in possession of such articles, things, or places, that the same are so infested, or in case such fruit trees or nursery stock, although apparently sound and not infested by any pest, shall have been from an infested district beyond the limits of this State, they shall also so notify the owner or owners, or persons in charge of or in possession of the same, and shall require said persons to eradicate or destroy said insects or pests or their eggs or larvae, or such imported fruit trees, or nursery stock of infested districts without the limits of the State, or to treat such contagious diseases within a certain time to be specified in said notice. Said notice may be served upon the person or persons,

or any of them, owning, having charge or having possession of such infested place, article or thing, by any member of the board, or by a State or county inspector, or by any person deputed by a member of said board for that purpose, or it may be served in the same manner as a summons in an action at law. It shall be the duty of the sheriff of any county to serve such notice when requested to do so by the commissioner of the board whose district includes such county. Such notice shall state the spray to be used or the treatment to be applied for the eradication of said insect pests, their eggs and larvae, and contagious diseases and fungous growths, and the abatement of the nuisance aforementioned. The treatment may include the destruction of the infested or infected articles if such destruction is necessary in the judgment of the person inspecting the same under the authority conferred by this law. And any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruit or article thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist in any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or on the property of any nonresident or any property not in the possession of any person and the owner or owners of which can not be found by the resident member of the board or the State or county inspector after diligent search within the county in which such nuisance exists, it shall be the duty of the board or the member thereof in whose district the nuisance shall exist, or the State or county inspector under his or their directions, to cause such nuisance to be at once abated by eradicating or destroying said insects or pests or their eggs or larvae, or by treating or disinfecting or destroying the infested or diseased articles. The expense thereof shall be a county charge and the county court shall allow and pay the same out of the general fund of the county. The date and amount of every such payment shall be immediately entered by the county clerk, in the public record book to be known as the horticultural lien book, and said entry shall give a description of the property and premises upon which such nuisance has been abated sufficient for identification, and shall also state the name of the owner or reputed owner of said property and premises, if known, and thereupon the sum so paid shall be and become a lien upon said property and premises, and such lien shall be preferred to all subsequent liens, mortgages and other incumbrances. Thereupon it shall be the duty of the county clerk to forthwith notify the owner or reputed owner, if known, of the date and amount of said lien, and that the amount thereof with the added sum of one dollar for recording and discharging fee must be paid forthwith, and such notice shall be deposited in the postoffice with the postage prepaid, addressed to the owner or reputed owner or owners of said property and premises at his or her or their last known address. If the amount of said lien and fee is paid before suit is commenced to foreclose said lien, the county clerk shall thereupon release said lien upon said horticultural lien book. If the same has not been paid at the expiration of five months from the date of entry of the lien, the county clerk shall notify the district attorney for the county in which the lien is recorded, and the district attorney shall thereupon and within six months from the date of entry of said lien, in the name of and for the benefit of the county in which said lien is recorded, proceed against said property and premises by a suit in equity in the circuit court to recover the amount of said lien, fee, costs and a reasonable attorney's fee. The proceedings in such case shall be governed by the same rules as far as may be applicable as a suit to foreclose a mechanic's lien, and the property shall be sold and the proceeds applied in like manner.

The board is hereby invested with the power to cause such nuisances to be abated in a summary manner. [L. O. L., § 5487; L. 1917, Chap. 135, Sec. 1; L. 1919, Chap. 331.]

§ 8862. Duties of Secretary. It shall be the duty of the secretary to attend all meetings of the board, and to preserve records of the proceedings, correspondence, and actions of the board, to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and general information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges, and schools of agriculture and horticulture, and such other persons and bodies as may be directed by the board, and prepare as required by the board reports for publication. [L. 1889, p. 129, Sec. 9; L. 1895, p. 38, Sec. 9; B. & C., Sec. 4186; L. O. L., § 5488.]

§ 8863. Biennial Report; Compensation of Board Members. The board shall biennially, in the month of January, report to the legislative assembly a statement of its doings with a copy of the treasurer's reports for the two years preceding the session thereof. The members shall receive as compensation their actual expenses while engaged upon the work of the board or the enforcement of the provisions of this act, and shall be allowed $3.00 a day for the time actually employed. [L. 1889, p. 129, Sec. 11; L. 1895, p. 38, Sec. 11; B. & C., Sec. 4187; L. O. L., § 5489.]

§ 8864. Board to Report to Legislature. The said board shall report to the legislative assembly, commencing in January, 1891, what, if any, legislation is needed in aid of the horticultural and fruit growing interests of the State. [L. 1889, p. 130, Sec. 14; B. & C., Sec. 4189; L. O. L., § 5491.]

§ 8879. All Prunings and Cuttings Required to Be Burned. It shall hereafter be unlawful for any person, firm or corporation owning or operating any nursery, fruit orchard of any kind, hopyards, flower gardens, or ornamental trees to throw any cuttings or prunings from any fruit trees, nursery stock, ornamental trees, or hop vines into any public road, highway, lane, field or other inclosure, or into any watercourse of any kind; but shall destroy such cuttings or prunings with fire within thirty days from the time such cuttings or prunings are made. [L. 1899, p. 97, Sec. 1; B. & C., Sec. 4190; L. O. L., § 5495.]

§ 8880. Owners of Nurseries, Etc., Required to Spray. It shall hereafter be the duty of any person, firm or corporation owning or operating any such nursery, fruit orchard, hopyard, flower garden, or ornamental trees, and knowing such to be infected with any kind of insects, pests, or disease, to immediately spray or destroy the same in such manner as the fruit commissioner for his district may direct. [L. 1899, p. 97, Sec. 2; B. & C., Sec. 4191; L. O. L., § 5496.]

§ 8881. It shall be unlawful for any person, firm or corporation to import or sell any infested or diseased fruit of any kind in the State of Oregon, except that such fruit may be sold to evaporators, fruit canneries, fruit product factories, or other byproduct factories under the following conditions:

First. Such fruit so sold shall be used solely for the production of manufactured fruit products, beverages, or other manufactured products or byproducts.

Second. The nature of the infestation or infection shall not be such as to make the article of food or beverage manufactured from such fruit unhealthful or unfit for use as a food or beverage. [L. O. L., § 5499; L. 1917, Chap. 106, Sec. 1.]

§ 8882. Packing, Etc., or Delivering for Shipment Infected Fruit, Etc., a Misdemeanor. Every person who packs or prepares for shipment to any point within the State, or who delivers or causes to be delivered to any express agent or railroad agent, or other person, or to any transportation company or corporation, for shipment to any point without the State, any fruit or fruits, either

fresh, cured or dried, that is infected with insect pests or diseases injurious to trees, shrubs, plants, fruits, or vegetables, is guilty of a misdemeanor. [L. 1899, p. 98, Sec. 6; B. & C., Sec. 4195; L. O. L., § 5500.]

§ 8883. **Penalty for Violating Provisions of Act.** Any person, firm or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than $25.00 nor more than $100.00. [L. 1899, p. 98, Sec. 7; B. & C., Sec. 4196; L. O. L., § 5501.]

§ 8884. **Commissioner of Horticulture to Present Evidence and District Attorney to Prosecute.** It shall be the duty of the commissioner of the State Board of Horticulture of the district in which a violation of this act occurs to present the evidence of the case to the district attorney, whose duty it shall be to prosecute any person guilty of a violation of this act, which prosecution may be brought in any of the justice courts of this state. [L. 1899, p. 98, Sec. 8; B. & C., Sec. 4197; L. O. L., § 5502.]

PACKING AND LABELING FRUIT AND NURSERY STOCK

§ 8885. **Green Fruit Packed for Market to Be Labeled.** Any person, firm, association or corporation engaged in growing, selling or packing green fruits of any kind within the State of Oregon, shall be required, upon packing any such fruit for market, whether intended for sale within or without the State of Oregon, to stamp, mark, or label plainly on the outside of every box or package of green fruit so packed, the name and postoffice address of the person, firm, association or corporation packing the same; provided further, that when the grower of such fruit be other than the packer of the same, the name and postoffice address of such grower shall also prominently appear upon such box or package as the grower of such fruit. [L. 1907, Chap. 11, p. 22, Sec. 1; L. O. L., § 5503.]

§ 8886. **False Representation as to Place of Raising or Packing Fruit Forbidden.** It shall be unlawful for any dealer, commission merchant, shipper or vendor, by means of any false representations whatever, either verbal, printed or written, to represent or pretend that any fruits mentioned in Section 8885, were raised, produced or packed by any person or corporation or in any locality, other than by the person or corporation, or in the locality where the same were in fact raised, produced or packed, as the case may be. [L. 1907, Chap. 11, p. 22, Sec. 2; L. O. L., § 5504.]

§ 8887. **Possession of Fruit Falsely Labeled; Evidence.** If any dealer, commission merchant, shipper, vendor or other person, shall have in his possession any of such fruits so falsely marked or labeled contrary to the provisions of Section 5503, the possession by such dealer, commission merchant, shipper, vendor, or other person, of any such fruits so falsely marked or labeled shall be prima facie evidence that such dealer, commission merchant, shipper, vendor or other person, has so falsely marked or labeled such fruits. [L. 1907, Chap. 11, p. 22, Sec. 3; L. O. L., § 5505.]

§ 8888. **Penalty for Violation of Act.** Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not less than $5.00 nor more than $500.00, or by imprisonment in the county jail not less than ten nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court. [L. 1907, Chap. 11, p. 22, Sec. 4; L. O. L., § 5506.]

§ 8889. **Liability for False Representation as to Variety of Nursery Stock.** Any person selling nursery stock, or young trees, and representing the same to be of a variety different from what said nursery stock of trees actually are,

shall be required to replace all such trees with stock of the same grade and variety as the original order and shall be required to make reasonable compensation to the purchaser for expenses and loss of time due to such error having been made. [L. 1907, Chap. 57, p. 109; L. O. L., § 5507.]

§ 8697. Packers of Fruit or Vegetables Must Label Them as "Oregon Grown" or "Packed in Oregon." That all persons, firms or corporations operating under their own private brand in the State of Oregon in the business of packing or canning fruit or vegetables, either fresh, canned, evaporated or otherwise, shall plainly designate on such private brand that goods were Oregon grown or packed in Oregon. For the purpose of this act it will be sufficient for the firms whose headquarters are in Oregon to either designate the local address of the cannery or to designate the location of their main office in the State of Oregon. This act shall not apply to sales to wholesalers, packers or others for repacking. [L. 1919, Chap. 393, Sec. 1.]

§ 8698. Penalty for Violation. Any person, firm or corporation which shall fail, neglect or refuse to comply with the terms of this act shall upon conviction thereof, be fined for each offense in a sum not less than $10.00 nor more than $50.00. [L. 1919, Chap. 393, Sec. 2.]

QUARANTINE LAW

§ 8869. Proclamation of Governor Prohibiting Importation of Nursery Stock, Etc. That whenever, in order to prevent the introduction into the State of Oregon of any tree, plant or fruit disease, or of any injurious insect or animal not theretofore widely prevalent or distributed within and throughout the State of Oregon, the commissioner at large of the State Board of Horticulture shall determine that it is necessary to forbid the importation of any class of nursery stock or of any other class of plants, fruits, vegetables, roots, bulbs, seeds or other plant products or of any articles which are naturally, or liable to be, the hosts of such injurious diseases, insects or animals, from country or locality where such disease or insect or animal infestation exists, he shall promulgate such determination, specifying the country and locality and the class of nursery stock or other article which in his judgment should be excluded. Following the promulgation of such determination by the commissioner at large of the State Board of Horticulture, and until the withdrawal of said promulgation by him, the importation into the State of Oregon of the article or articles specified in the said promulgation from any country or locality specified in the said promulgation is hereby prohibited; provided, that before such promulgation becomes effective the Governor of the State of Oregon shall approve such promulgation in writing thereon, and such promulgation so approved shall have been published in three newspapers designated by the Governor in writing. Whenever the commissioner at large of the State Board of Horticulture deems it for the best interest of the State of Oregon to withdraw such promulgation, he can do so with the written approval of the Governor of Oregon by publishing a notice of such withdrawal in three newspapers to be designated by the Governor. Proofs of publication of such promulgations and withdrawals of promulgations shall be filed in the office of the Secretary of State. [L. 1913, Chap. 246, Sec. 1.]

§ 8870. Quarantine of Locality Where Disease Prevalent. The commissioner at large of the State Board of Horticulture is authorized and directed to quarantine any locality within the State of Oregon when he shall determine the fact that a dangerous plant disease or insect infestation new to or not theretofore widely prevalent or distributed within and throughout the State exists in such locality. The commissioner at large of the State Board of Horticulture shall publish a notice of such quarantine in such newspaper published within or near

the quarantined locality as the Governor of Oregon may designate, and the quarantine shall be effective immediately upon the publication of such notice. Such notice must be approved in writing by the Governor before publication. From and after the publication of such notice it shall be unlawful for any person, firm or corporation to carry or transport any article or articles specified in the notice of quarantine from the quarantined locality into or through any other part of the State. Whenever it appears to the commissioner at large that such quarantine of such locality is no longer necessary, he shall give notice that such quarantine is no longer in force. Such notice shall be approved by the Governor in writing and shall be published in some newspaper within or near the quarantined locality to be designated by the Governor. Proofs of the publication of the notices provided for in this section shall be filed in the office of the Secretary of State. [L. 1913, Chap. 246, Sec. 2.]

§ 8867. Appointment of State Inspector—Duties—Salary. The State Board of Horticulture shall appoint a State inspector to hold office during the pleasure of the board. It shall be the special duty of the State inspector to inspect nursery stock, trees, shrubs, plants, fruits and vegetables and other articles mentioned in this act, coming from points without the State, and to enforce the provisions of this act and all other horticultural laws of the State relating thereto. He shall also have all the duties, powers and rights of a county inspector and is granted jurisdiction to act throughout the State. His salary shall be $1,200.00 per year and he shall be allowed the expenses necessarily incurred in the performance of his duties. His salary and necessary expenses shall be paid monthly in the same manner as the members of the State Board of Horticulture are paid from the funds appropriated for the said board; provided, that his monthly account shall be first approved in writing by the commissioner at large of the State Board of Horticulture. Before entering upon his duties, the State inspector shall make and subscribe an oath to support the Constitution of the United States and the State of Oregon, and to diligently, faithfully and impartially discharge the duties of his office. This oath shall be filed in the office of the Secretary of State. [L. 1913, Chap. 246, Sec. 3.]

§ 8868. Collaboration With Department of Agriculture. The members and officers of the State Board of Horticulture and the State Inspector and the county inspectors are authorized to collaborate with the Department of Agriculture of the United States in all matters relating to the inspection of nursery stock, plants, fruits, vegetables, bulbs, seeds or other plant products shipped into the State of Oregon from foreign countries or from other states or territories. [L. 1913, Chap. 246, Sec. 11.]

§ 8871. Inspection of Nursery Stock, Etc., Brought Into State. Any person, persons, firm or corporation who shall bring or cause to be brought into the State of Oregon, any nursery stock, trees, shrubs, plants, vines, cuttings, grafts, scions, buds, fruit pits, or fruits or vegetables, shall immediately after the arrival thereof, notify the State inspector, if he be in the county in which such articles are received, of their arrival, and hold the same without unnecessarily moving the same or placing such articles where they may be harmful, for the immediate inspection of said State inspector or county inspector or other person authorized to make such inspection. If there is no State inspector in the county in which such article is received, it shall then be the duty of such person, firm or corporation to notify the county inspector of the county in which the article is received. If there is neither State inspector nor county inspector in the county in which such article is received then it shall be the duty of the person, firm or corporation, to notify the commissioner of the State Board of Horticulture for the district which includes said county who shall make immediate arrangement for the inspection of such article or articles. The commissioners of the State Board of Horticulture and their deputies, the secretary of the State Board

of Horticulture, the state inspector, and the county inspectors and their deputies are hereby authorized and empowered to enter at any time into any car, warehouse, depot or upon any ship within the boundaries of the State of Oregon, whether in the stream or at the dock, wharf, mole, or any other place where such nursery stock or fruit, or vegetables, or seed, or other such articles are received, or in which any of such articles are imported into the state, for the purpose of making the investigation or examination to ascertain whether such articles are infested with any injurious insects or their eggs, larvae or pupae, or other animal or plant disease.

If, after such examination or inspection, any of said articles are found so infected or infested, then it shall be the duty of the owner, owners, or persons, firm or firms, or corporation having charge or possession thereof to so disinfect at his or their expense such portion or portions of the ship, dock, wharf, mole or car or warehouse or depot where such articles may have been located in such a manner as to destroy all infection or infestation present, and all articles apt to be so infested or infected shall be held until the said articles have been thoroughly disinfected and all injurious insects, or their eggs, larvae or pupae or other animal or plant diseases have been eradicated and destroyed; provided, however, that all articles of nursery stock, trees, shrubs, plants, vines, cuttings, grafts, scions, buds, fruit pits, fruits, vegetables or seed which are infested or infected with injurious insects or their eggs, larvae or pupae, or other animals, or with injurious plant disease liable to cause damage in this State, shall be destroyed or reshipped out of the State as hereinafter provided. [L. 1913, Chap. 246, Sec. 4.]

§ 8872. Infected Trees, Plants, Etc., to Be Shipped Out of State in Certain Cases—Destruction in Other Cases—Separation of Infected and Noninfected Trees, Plants, Etc. When any shipment of nursery stock, trees, vines, plants, shrubs, cuttings, grafts, scions, buds, fruit pits, or fruits or vegetables or seed imported or brought into this State is found infested or infected with any injurious insects or their eggs, larvae or pupae or other animals or with any plant disease liable to be detrimental to orchards, vineyards, gardens or farms in Oregon, or any part thereof, and the nature of the animals or insects or diseases is such that there will not be danger of the escape or spread of such animals, insects or diseases if the infested or infected articles are promptly shipped out of the State, then the State inspector, county inspector or other person duly authorized to make inspection of such articles and who has made such inspection shall notify the owner, or persons, firm or corporation having possession or control of said articles to ship the same out of the State within a specified time, the limit of which shall be not less than forty-eight hours, nor more than ten days, according to the nature of the insects, or diseases, and it shall be the duty of such owner or owners, or persons, firm or corporation, to so ship said articles, but such shipment shall be made under the direction of the officer making the inspection and shall be at the expense of the owner or owners, his or their agents; in case of a failure of the owner or owners or his or their agents to comply with the notice the said articles shall be destroyed by said officer at the expense of the said owner or owners, his or their agents. When any carload, case, box, package, bale or bundle of such articles is in part infected or infested and the nature of the infestation or infection is such that the portion of shipment which is not infested or infected can be separated from the portion which is infected or infested without danger of escape from the infested or infected articles of the insects, their eggs, larvae or pupae, or the animals, or the disease or diseases with which such articles are infested, and the owner or person, firm or corporation having control or possession of such articles desires to separate the portion not infested or infected from the portion which is infested or infected, the officer making the inspection shall give a

permission in writing to make such separation within a time specified in such permission, which time shall be reasonable for the performance of the work, but with due regard to the safety of the State; such permission shall be granted only upon the condition that the owner or owners or his or their agents make such separation and destroy all the infested or infected portion at his or their own expense and under the supervision of the officer doing the inspection or of some person authorized by him to supervise the work of separation and destruction, and shall pay for the services of the person authorized to supervise such work when it is necessary for the officer making the inspection to authorize and depute some person to supervise such work. Whenever the official who makes such inspection has other official work awaiting and it appears that the time required for separating and destroying such articles may exceed one hour, he may authorize and depute some proper person to supervise the separation of the uninfested and uninfected articles from the infested or infected articles and the destruction of the infested or infected articles, and the person so authorized shall be paid for his services by the owner or owners or his or their agents for his services while supervising the separation and destruction of such articles. In case of the failure of the owner or owners, his or their agents to comply with the foregoing conditions within the time specified in the written permission, the contents of every such car, case, box, package, crate, bale or bundle containing articles infested or infected as aforesaid, shall be destroyed at the expense of the owner or owners, his or their agents.

When any shipment of any nursery stock, trees, vines, plants, shrubs, cuttings, scions, buds, fruit pits, seeds, fruits, vegetables or other articles brought into the State are infected or infested with any disease or insects or their eggs, larvae or pupae which are injurious to trees, plants, vines, shrubs, fruits, vegetables and other plant growths, and the nature of such infection or infestation is such that the shipment can not be reshipped out of the State without danger of damage to the orchards, vineyards, farms, gardens, and their productions, of Oregon, or to any of them, such shipment shall be immediately destroyed by the state inspector, county inspector or commissioner of the State Board of Horticulture, who shall have inspected the same, or under his direction. [L. 1913, Chap. 246, Sec. 5.]

§ 8873. Name and Address of Consignor and Consignee on Shipment Into State. Each carload, case, box, package, crate, bundle, or bale of trees, shrubs, plants, vines, cuttings, grafts, scions, buds, fruit pits, fruits or vegetables, imported or brought into this State shall have plainly and legibly marked thereon in a conspicuous manner and place, the name and address of the person, firm or corporation shipping the same, and the name and address of the consignee, also the name of the country, state or territory where the contents were grown and must show that it contains nursery stock, seedlings or seeds. [L. 1913, Chap. 246, Sec. 6.]

§ 8874 Unlawful to Ship Into State Certain Host Tree or Plant. No person, firm, or corporation shall bring or cause to be brought into the State of Oregon, any fruit or vegetable or host plant which is known to be, or hereafter may become a host plant or host fruit of any species of the fruit fly family, Trypetidae, from any country, state or district where such species of Trypetidae is known to exist and any such fruit, vegetable or host plant, together with its container and packing shall be immediately destroyed at the expense of the owner or agent. [L. 1913, Chap. 246, Sec. 7.]

§ 8875. Unlawful to Ship into State Tree Where Peach Yellow Is Prevalent. No person, firm or corporation shall bring or cause to be brought into the State of Oregon any peach, nectarine, or apricot tree or cuttings, grafts, scions, buds, or pits of such trees, or any trees budded or grafted upon peach stock or roots, that have been in a district where the contagious disease known as

"peach yellows," "little peach," and "peach rosette" or any one of them are known to exist and any such shipped into this state shall be destroyed or returned to the point of shipment at the option of the owner or agent and at his expense. [L. 1913, Chap. 246, Sec. 8.]

§ 8876. Trees, Plants, etc., Infected with Disease Declared Nuisance. Any nursery stock, trees, vines, plants, shrubs, cuttings, grafts, scions, buds, fruit pits, fruits, vegetables, or other articles infested with any species of injurious insects, or their eggs, larvae, or pupae, which would be liable to cause damage to the orchards, vineyards, farms and gardens and their products, or with any disease liable to spread to fruits, vegetables, trees, vines, plants, or any other useful product of the soil in Oregon, are hereby declared to be a public nuisance and the several commissioners of the State Board of Horticulture, the state inspector or the county inspector who inspects the same is invested with the power to abate the nuisance in a summary manner. [L. 1913, Chap. 246, Sec. 9.]

§ 8877. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than $100.00, or by imprisonment in the county jail for a period of not exceeding three months. All acts and parts of acts conflicting with the provisions of this act are hereby repealed. [L. 1913, Chap. 246, Secs. 10, 13.]

PROHIBITING SALE OF MISBRANDED INSECTICIDES AND FUNGICIDES

§ 8894. Unlawful to Manufacture Adulterated Insecticides, Paris Green, Lead Arsenate, Fungicide. That it shall be unlawful for any person, or persons, firm or corporation, to manufacture within the State of Oregon, any insecticide, Paris green, lead arsenate, or fungicide which is adulterated or misbranded within the meaning of this act, for use or sale within or without the State of Oregon; and any person who shall violate any of the provisions of this section shall be guilty of a misdemeanor, and shall, upon conviction thereof, be fined not less than fifty dollars ($50.00) nor more than two hundred dollars ($200.00) for the first offense, and upon conviction for each subsequent offense be fined not less than one hundred dollars ($100.00) nor more than three hundred dollars ($300.00) or sentenced to imprisonment in the county jail for not less than thirty days nor more than ninety days for the first offense, and not less than ninety days for the second offense, upon conviction, nor more than six months, or both such fine and imprisonment, in the discretion of the court. [L. 1911, Chap. 205, Sec. 1.]

§ 8895. Unlawful to Sell Same. That it shall be unlawful for any person or persons, firm or corporation, to sell, or offer for sale, within the State of Oregon, any insecticide, Paris green, lead arsenate, or fungicide which is adulterated or misbranded within the meaning of this act; and any person or persons, firm or corporation, who shall violate any of the provisoins of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined or imprisoned, or both, as is provided in Section 8894. [L. 1911, Chap. 205, Sec. 2.]

§ 8896. Who to Examine Specimens. That the examination of specimens of insecticides, Paris green, lead arsenates, and fungicides shall be made by the chemist of the Oregon Agricultural College, at Corvallis, Oregon, or the State Board of Health, at Portland, Oregon, or by the chemist of the University of Oregon, at Eugene, Oregon, for the purpose of determining from such examination whether such article or articles are adulterated or misbranded within the meaning of this act; and if it shall appear from any such examination that any of such specimens are adulterated or misbranded within the meaning of this act, it shall be the duty of the prosecuting attorney within the district

where the offense is committed to institute proper criminal proceedings against any person or persons, firm or corporation, so manufacturing, selling or offering for sale any such misbranded, adulterated or fraudulent article as set forth in Sections 8894 and 8895. [L. 1911, Chap. 205, Sec. 3.]

§ 8897. Definition of Terms. That the term "insecticide" as used in this act shall include any substance or mixture of substances intended to be used for preventing, destroying, repelling, or mitigating any insects which may infest vegetation, man or other animals, or households, or be present in any environment whatsoever. The term "Paris green" as used in this act shall include the product sold in commerce as Paris green and chemically known as the aceto-arsenite of copper. The term "lead arsenate" as used in this act shall include the product or products sold in commerce as lead arsenate and consisting chemically of products derived from arsenic acid (H_3AsO_4) by replacing one or more hydrogen atoms by lead. That the term "fungicide" as used in this act shall include any substance or mixture of substances intended to be used for preventing, destroying, repelling, or mitigating any and all fungi that may infest vegetation or be present in any environment whatsoever. [L. 1911, Chap. 205, Sec. 4.]

§ 8898. What Constitutes Adulterated Paris Green, etc. That for the purpose of this act an article shall be deemed to be adulterated—

In the case of Paris green: First, if it does not contain at least 50 per centum of arsenious oxide; second, if it contains arsenic in water-soluble forms equivalent to more than three and one-half per centum of arsenious oxide; third, if any substance has been mixed and packed with it so as to reduce or lower or injuriously affect its quality or strength.

In the case of lead arsenate: First, if it contains more than 50 per centum of water; second, if it contains total arsenic equivalent to less than 12 per centum of arsenic oxide (As_2O_5); third, if it contains arsenic in water-soluble forms equivalent to more than seventy-five one hundredths per centum of arsenic oxide (As_2O_5); fourth, if any substances have been mixed and packed with it so as to reduce, lower, or injuriously affect its quality or strength; provided, however, that extra water may be added to lead arsenate (as described in this paragraph) if the resulting mixture is labeled lead arsenate and water, the percentage of extra water being plainly and correctly stated on the label.

In the case of insecticides or fungicides, other than Paris green and lead arsenate: First, if its strength or purity falls below the professed standard or quality under which it is sold; second, if any substance has been substituted wholly or in part for the article; third, if any valuable constituent of the article has been wholly or in part abstracted; fourth, if it is intended for use on vegetation and shall contain any substances which, although preventing, destroying, repelling or mitigating insects, shall be injurious to such vegetation when used.

§ 8899. What Deemed Misbranded Paris Green, etc. That the term "misbranded" as used herein shall apply to all insecticides, Paris greens, lead arsenates or fungicides, or articles which enter into the composition of insecticides or fungicides, the package or label of which shall bear any statement, design, or device regarding such article or the ingredients or substances contained therein which shall be false or misleading in any particular, and to all insecticides, Paris greens, lead arsenates, or fungicides which are falsely branded.

That for the purpose of this act an article shall be deemed to be misbranded—

In the case of insecticides, Paris greens, lead arsenates and fungicides: First, if it be an imitation or offered for sale under the name of another article; second, if it be labeled or branded so as to deceive or mislead the purchaser, or if the contents of the package as orginally put up shall have been removed in whole or in part and other contents shall have been placed in the package; third,

if in package form, and the contents are stated in terms of weight or measure, they are not plainly and correctly stated on the outside of the package; fourth, if the label does not state the chemical formula of the compound or compounds which shall constitute the insecticide, Paris green, lead arsenate or fungicide, contained within the package.

In the case of insecticides (other than Paris greens and lead arsenates) and fungicides: First, if it contains arsenic in any of its combinations or in the elemental form and the total amount of arsenic present (expressed as per centum or metallic arsenic) is not stated on the label; second, if it contains arsenic in any of its combinations or in the elemental form and the amount of arsenic in water-soluble forms (expressed as per centum of metallic arsenic) is not stated on the label; third, if it consists partially or completely of an inert substance or substances which do not prevent, destroy, repel, or mitigate insects or fungi and does not have the names and percentage amounts of each and every one of such inert ingredients plainly and correctly stated on the label. [L. 1911, Chap. 205, Sec. 6.]

§ 8900. License Not Required to Sell Paris Green, etc. No license or other qualification shall be required to enable any and all persons to engage in the sale and disposal of any of the above named insecticides, fungicides or any other fungus or insect destroying, preventing or repelling poisons, agents or preparations. [L. 1911, Chap. 205, Sec. 7.]

REGULATING SALE OF LIM-SULPHUR SOLUTION

§ 8901. Specific Gravity of Lime and Sulphur Solution for Spraying. No person, firm or corporation shall sell, offer, or expose for sale, any lime and sulphur solution or compound for spraying purposes, which shall have a specific gravity of less than 30 degrees, Beaume test, or which contains anything except products which arise from boiling lime and sulphur in water, and no salt or other soluble substance shall be used therein. [L. 1911, Chap. 146, Sec. 1.]

§ 8902. Labeling of Packages. Every package of such compound or solution sold, offered, or exposed for sale shall be plainly labeled with black-faced type, in letters of not less than one-half of an inch in height, stating the contents of the compound or solution and the gravity test thereof. [L. 1911, Chap. 146, Sec. 2.]

§ 8903. Penalty Clause. Any person, firm or corporation selling, offering or exposing for sale any lime and sulphur solution or compound which does not comply with the provisions of this act, either as to test, ingredients, label or otherwise, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than $10.00 nor more than $100.00, or by imprisonment in the county jail not more than sixty days, or by both such fine and imprisonment, in the discretion of the court. [L. 1911, Chap. 146, Sec. 3.]

ESTABLISHING STANDARD SIZES OF APPLE BOXES

§ 8150. Standard Apple Box. There is hereby created and established a standard size for apple boxes for the State of Oregon. [L. 1911, Chap. 123, Sec. 1.]

§ 8151. Standard Size. The standard size of an apple box shall be eighteen inches long, eleven and one-half inches wide, ten and one-half inches deep, inside measurement. [L. 1911, Chap. 123, Sec. 2.]

§ 8152. Special Size. That the special size of apple boxes shall be twenty inches long, eleven inches wide, and ten inches deep, inside measurement. [L. 1911, Chap. 123, Sec. 3.]

NURSERY LAW

(Chapter 33, Laws of 1921)

Effective on and after May 25, 1921

AN ACT

[H. B. 63]

Providing for the licensing of nurserymen and dealers in nursery stock and their agents, salesmen and solicitors, and providing a penalty for failure to conform with the act.

Be It Enacted by the People of the State of Oregon:

Section 1. It shall be unlawful for any person, firm or corporation to engage in, conduct or carry on the business of selling, dealing in or importing into this state for sale or distribution, any nursery stock, or to act as agent, salesman or solicitor for any nurseryman or dealer in nursery stock, or to solicit orders for the sale of nursery stock, without first obtaining a license to do so from the state board of horticulture; and it shall be unlawful for any person to falsely represent that he is the agent, salesman, solicitor or representative of any nurseryman or dealer in any nursery stock. No license shall be issued until the applicant therefor shall have paid the fee and furnished the bond as hereinafter provided. The license fee for a nurseryman, dealer or importer of nursery stock shall be ten dollars ($10), and for any agent, salesman or solicitor, the license fee shall be one dollar ($1). All licenses shall be issued in the name of the person, firm or corporation licensed, and shall show the purpose for which issued, the name and location of the nursery or place of business of the nurseryman or dealer licensed, and the name and address of the agent, salesman or solicitor licensed, and the name and business address of the nurseryman or dealer represented by such agent, salesman or solicitor.

Section 2. All licenses shall bear the date of issue and shall expire on the first of July, next following the date of issue, unless sooner revoked by the state board of horticulture.

Section 3. Every person, firm or corporation licensed under the provisions of this act to engage in, conduct or carry on the business of selling, dealing in or importing into this state for sale or distribution any nursery stock, may appoint agents, salesmen or solicitors to solicit orders for the sale of nursery stock. Upon making the appointment of any agent, salesman or solicitor as above provided, said person, firm or corporation shall immediately make application to the state board of horticulture for a license for said agent, salesman or solicitor, accompanying said application by the fee of $1 provided for in section 1 of this act. The state board of horticulture shall thereupon issue to such agent, salesman or solicitor a license setting forth that such agent, salesman or solicitor is entitled to solicit orders for the sale of nursery stock for the current year, ending the first day of July, next following the date of the issuance of said license.

Section 4. Every nurseryman, dealer or importer of nursery stock shall make application for a license therefor to the state board of horticulture upon a form to be prescribed and furnished by said board, and with said application the applicant shall pay to said board the license fee of $10 as provided in section 1 of this act, and shall deliver to said board a bond to the state of Oregon in a form approved by said board in the sum of one thousand dollars ($1,000), executed by a responsible surety company approved by said board conditioned that if said license is issued, said applicant will well and faithfully comply with all the provisions of this act and the laws of the state of Oregon relating to the sale, disposition, delivery, inspection and disinfection of nursery stock grown, dealt in, imported, sold, handled or delivered by said applicant during the term of the license applied for, and conditioned that all nursery stock sold or

delivered by said applicant during the term of said license shall be true to name, age and variety as represented, and free from the diseases and pests required to be guarded against as provided by the laws of this state. Any person who may be damaged by reason of failure of any licensee to comply with the provisions of this act or the laws of the state of Oregon relating to the sale, disposition, delivery, inspection or disinfection of nursery stock, or by reason of the failure of such stock to be true to name, age or variety as represented and free from the diseases and pests required to be guarded against as provided by the laws of this state, shall in addition to other legal remedies, have a right of action in his own name on such bond for all damages, not exceeding one thousand dollars ($1,000), which he may have suffered by reason of any such failure as herein set forth.

Section 5. Upon complaint in writing, verified under oath by the complainant, being made to the state board of horticulture, that the holder of any license in this act provided for has violated or failed to comply with the provisions of this act or the laws of the state of Oregon relating to horticulture, the state board of horticulture, if in the judgment of the members thereof the complaint justifies a hearing thereon, shall serve upon the holders of such license by registered mail, a copy of such complaint and a notice of the time and place of hearing the same, which hearing shall not be less than ten nor more than thirty days from the date of mailing said notice, and shall be at such place to be determined by the said state board of horticulture as shall be most convenient to all the parties to the hearing; provided, that in case the nursery and the principal place of business thereof is within this state, then the hearing shall take place in the county where the nursery or principal place of business is located, for the convenience of the witnesses called upon to attend such hearing.

Section 6. The state board of horticulture, for the purpose mentioned in this act, shall have the power to administer oaths, issue subpenas and compel the attendance of witnesses at the hearing provided for in section 5 of this act. In case of disobedience on the part of any person or persons to comply with any subpena herein provided for, or the refusal of any witness to testify to any matter regarding which he may be lawfully interrogated, it shall be the duty of any circuit court of any county or the judge thereof, on application of said board, to compel obedience by attachment proceedings for contempt, as in the case of disobedience of the requirements of a subpena issued from such court, or a refusal to testify therein. Hearings may be held by any member of the state board of horticulture, acting for the whole board, and a synopsis of the testimony shall be taken, and considered by said board, in case the hearing be held by any member or members less than the whole board, and findings shall be made by the whole board. If upon such hearing, it shall appear to the satisfaction of the said board, that the person complained of has violated or is violating or failing to comply with the provisions of this act or the laws of the state of Oregon relating to horticulture, said board may revoke the license of such person, firm or corporation complained of, and no new license shall issue to such person, firm or corporation until it shall be made to appear to the satisfaction of the state board of horticulture that the cause of the complaint has been removed. From the decision of the state board of horticulture revoking a license or refusing to issue a new license, an appeal shall lie to the circuit court of the county where the hearing shall have been held; provided, that the failure of 5 per cent of any nursery stock delivered under any order to any individual to be true to name, age and variety shall not be deemed to be a violation of this act.

Section 7. Any funds received by the state board of horticulture under the provisions of this act shall be used in defraying the necessary expenses in connection with the administration of this act, and the residue, if any, shall be paid into the state treasury.

Section 8. Any person, firm or corporation wilfully violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than $50, or by imprisonment in the county jail for a period not to exceed thirty days.

APPLE AND PEAR GRADING LAW

(Chapter 206, Laws of 1921)

Effective on and after May 25, 1921.

AN ACT

[H. B. 330]

To establish standard grading and packing rules covering the grading and packing of apples and pears, in the state of Oregon, same to be recognized as the minimum requirements for the various grades set forth herein.

Be It Enacted by the People of the State of Oregon:

Section 1. There shall be five regular standard grades of apples: extra fancy or "blue" grade, fancy or "red" grade, "C" grade, combination grade and orchard run grade.

Extra Fancy or "Blue" Grade.—Extra fancy apples are defined as sound, mature, clean, hand-picked, well-formed apples only, free from all insect pests, diseases, blemishes, bruises and other physical injuries, spray burns, limb rub, visible water core, skin punctures, or skin broken at the stem; but characteristic russeting at the stem end shall be permitted.

Fancy or "Red" Grade.—Fancy apples are defined as apples complying with the standard of extra fancy grade, except that slight leaf rubs, scratches, or russeting shall be permitted up to a total of 10 per cent of the surface; and provided, that scab spots not larger than one-quarter of an inch in diameter in the aggregate shall be permitted in this grade. One healed worm sting may be permitted in apples otherwise meeting the requirements of the extra fancy grade.

"C" Grade.—"C" grade apples shall consist of sound, mature, hand-picked apples which are practically free from infection, bruising or broken skin, and which are not badly misshappen; provided, that two healed worm stings, slight sun scald, and scab up to a total of one-half inch in diameter shall be permitted in this grade, and the blemishes allowed in the fancy grade.

Combination Grade.—When extra fancy and fancy apples are packed together, the boxes must be marked "Combination Extra Fancy and Fancy." When fancy and "C" grade apples are packed together, the box must be marked "Combination Fancy and 'C' Grades." Combination grades must contain at least 25 per cent of apples which are of such a grade as would be permitted in the higher grades. None of the higher grade apples shall be sorted out of any lot and the remainder packed as combination grade.

Orchard Run.—When extra fancy, fancy and "C" grade apples are packed together, the boxes must be marked "Orchard Run," but orchard run apples must not contain any fruit that will not meet the requirements of "C" grade. None of the higher grade apples shall be sorted out of any lot and the remainder packed as "orchard run."

Unclassified.—All firm apples which are practically free from infection but which do not conform to the foregoing specification of grade, or if conforming, are not branded in accordance with, shall be classed "unclassified," and so branded; provided, that no restriction shall be placed upon the number of worm stings admitted to this class. Open worm holes will not be permitted. This grade must be plainly marked with the word "Unclassified."

Color Requirements.—Apples shall be admitted to the extra fancy and fancy grades, subject to the following color requirements. The percentage stated refers to the area of the surface which must be covered with a characteristic shade of red:

SOLID RED VARIETIES

	Extra fancy per cent	Fancy per cent
Aiken	75	25
Arkansas Black	75	25
Baldwin	75	25
Black Ben Davis	75	25
Detroit Red	75	25
Gano	75	25
King David	75	25
Red June	75	25
Spitzenburg Esopus	75	25
Spitzenburg Kaign	75	25
Vanderpool	75	25
Winesap	75	25
Oregon Red	75	25
Jonathan	66⅔	25
McIntosh Red	66⅔	25

STRIPED OR PARTIAL RED VARIETIES

	Extra fancy per cent	Fancy per cent
Delicious	66⅔	25
Stayman Winesap	66⅔	25
Black Twig	50	25
Ben Davis	50	15
Bonum	50	15
Fameuse	50	15
Geniton	50	15
Hubbardston	50	15
Limbertwig	50	15
Missouri Pippin	50	15
Northern Spy	50	15
Ontario	50	15
Red Astrachan	50	15
Rainier	50	15
Rome Beauty	*50	15
Salome	50	15
Stark	50	15
Sutton	50	15
Willowtwig	50	15
Wagener	50	15
Wealthy	50	15
York Imperial	50	15
Alexander	25	10
Chenango	25	10
Jeffries	25	10
Gravenstein	25	10
King	25	10
Oldenburg	25	10
Shiawassee	25	10
Twenty Ounce	25	10

*No color requirements on fancy Rome Beauty 96 and larger.

Red cheeked or blushed varieties:

Extra fancy—Perceptibly blushed cheek.
Fancy—Characteristic color.
Hyde's King, Maiden Blush, Red Cheek Pippin, Winter Banana.

Green and yellow varieties:

Extra fancy—Characteristic color.
Fancy—Characteristic color.
Grimes' Golden, Yellow Newtown, White Winter Pearmain, Cox's Orange, Pippin, Ortley, Yellow Bellflower, Rhode Island Greening.

Summer and fall varieties:

Summer varieties, such as Astrachan, Bailey's Sweet, Beitegheimer, Duchess, Early Harvest, Red June, Strawberry, Twenty-ounce Pippin, Yellow Transparent and kindred varieties not otherwise specified in these grading rules, together with early fall varieties, such as Alexander, Blue Pearmain, Wolf River, Spokane Beauty, Fall Pippin, Waxen, Tolman Sweet, Sweet Bough and other varieties not provided for in these grading rules, as grown in sections of early maturity, shall be packed in accordance with the grading rules hereinbefore set forth as to defects but may be admitted to fancy grade regardless of color.

Section 2. There shall be two regular or standard grades of pears, extra fancy or "blue" grade, and fancy or "red" grade.

The standard pear box for the state of Oregon shall be of the following inside dimensions: eight and one-half inches deep, eleven and one-half inches wide and eighteen inches long. Every box of pears shall have clearly marked upon it the grade, the name of the variety contained therein, or the words "Variety Unknown," the name of the place where grown, the name of the grower, or in case of sale or shipment through an association or shipper, the name of the association or shipper, net weight and number contained in the box. Packed boxes must weigh not less than forty-two pounds net, except Winter Nelis which should weigh at least forty pounds net.

Extra Fancy Grade.—This grade shall consist of pears that are mature, hand picked, clean, sound and free from insect pests, sun scald, scab, scale or other diseases, worm holes, stings, broken skin, bruises; or evidence of frost, russeting, rough handling or other serious defects. Russeting covering a total area not to exceed one inch in diameter may be admitted, and also those varieties which are naturally russeted more or less. In the case of Winter Nelis and Bosc varieties, same grading will apply, except that the natural russeting is desirable and required. Slightly misshapen or slightly rubbed fruit may be admitted to this grade.

Fancy Grade.—This grade shall consist of all fruit which does not meet the requirements of the extra fancy grade as to blemishes and deformities but which in every way is sound and merchantable and free from disease. Scab to a total area of one-half inch in diameter, and not to exceed two worm stings healed thoroughly, shall be permitted in this grade.

Packing.—The term "properly packed" shall refer to the arrangement and the amount of pears in each box. Pears to be properly packed shall be arranged in the box according to approved and recognized methods, and all boxes shall be tightly filled but the contents not to show excessive or unnecessary bruising as a result of the pressure exerted in lidding the box. Pears may be packed in half boxes if so desired, boxes to be of same dimensions, excepting one-half of the depth, obtained in standard boxes.

Section 3. Definition of Terms; Tolerance.—In order to provide for the variations incident to commercial grading and handling, a "tolerance" of five

per cent (5%) for a total of all defects from the standard, will be permitted in all grades and shall be computed by counting, weighing or measuring the specimens judged to be below the standard of the grade.

Worm Stings.—The term "worm stings," as used in the foregoing grading rules, shall be interpreted to mean "thoroughly healed worm stings," as the healing over the sting is the only evidence we have to show that the so-called sting is not infected.

Scab.—Fancy Grade: Scab spots not larger than one-quarter (¼) of an inch in diameter in the aggregate in apples, and one-half (½) inch in pears shall be permitted in the fancy grade.

"C" Grade: Scab spots not larger than one-half (½) inch in diameter in the aggregate shall be permitted in the "C" grade.

Uniform in Size.—The term "uniform in size" shall be construed to mean that apples in any one package shall not vary more than one-half (½) inch in their greatest transverse diameter.

Packing.—The term "Properly packed" shall refer to the arrangement of apples in each package; apples to be properly packed shall be arranged in the container according to the approved and recognized methods and all packages shall be tightly filled but the contents shall not show excessive or "unnecessary bruising" as a result of the pressure exerted in inclosing an over-filled package.

Labels.—Extra fancy grade may be designated by the use of blue labels and fancy grade may be designated by the use of red labels.

Section 4. The packing and shipping of apples or pears under the Oregon standard grading and packing rules is not compulsory, but any grower, growers' association, firm or organization, desiring to ship under the standard grades as heretofore established in this act, may, upon application to the state board of horticulture, have such packed apples or pears inspected and certified that the same have been graded and packed in accordance with the Oregon standard grading and packing rules.

The Oregon state board of horticulture is hereby empowered and authorized to appoint competent persons to act as such inspectors, who shall have authority to issue certificates of inspection under such rules and regulations as may be adopted by the Oregon state board of horticulture.

The expense of inspection and the cost of certificates of inspection shall be paid by the grower, growers' association, firm or organization requesting such inspection.

Notice of Quarantine No. 1, Promulgation Relating to Alfalfa Weevil

It is a matter of common knowledge that an injurious insect pest, the alfalfa weevil (phytonomus posticus) exists in the States of Utah and Wyoming and in that portion of the State of Idaho, hereinafter described, which insect pest is not yet prevalent nor yet found within the State of Oregon, but which, if introduced, would cause great loss to growers of alfalfa, clover and similar plants, and it has been determined by the commissioner at large of the Oregon State Board of Horticulture that it is necessary to prohibit the importation into the State of Oregon from the infested states and portion of a state of all articles which are naturally, or are liable to be, the host of said alfalfa weevil:

Now, therefore, I, Wilbur K. Newell, commissioner at large of the Oregon State Board of Horticulture, do hereby declare that in order to prevent the introduction of said alfalfa weevil into Oregon it is necessary to prohibit the importation into the State of Oregon from the States of Utah and Wyoming and

from that portion of the State of Idaho bounded on the north by the 43d parallel north latitude, on the east by the State of Wyoming, on the south by the State of Utah, on the west by the 113th meridian west longitude and on the northwest by the Snake River, of all kinds of hay and straw, including hay, straw, grass, forage plants, weeds or tule used in cattle care or used for packing nursery stock of any kind, or in connection with hives of bees, or in any other way, and of alfalfa seed, and hereafter and until further notice such importations from the States of Utah and Wyoming and the hereinbefore described portion of Idaho is prohibited.

Done at the office of the Oregon State Board of Horticulture, Portland, Oregon, March 6, 1913.

WILBUR K. NEWELL,
Commissioner at Large of the Oregon State Board of Horticulture.

Approved: OSWALD WEST,
Governor of the State of Oregon, Salem, Oregon.

POWDERY SCAB

In the early part of the year 1915, the fact was definitely established that the potato disease known as the Powdery Scab of Potatoes had established itself in Tillamook County in this State. This disease had not previously been found in Oregon and was not known in any other county in the State. The State Board of Horticulture was advised by the Federal Horticultural Board of the United States Department of Agriculture that the disease was a dangerous one and for the protection of the potato industry in other portions of the State the following quarantine was established:

Oregon State Board of Horticulture, Notice of Quarantine No. 2

The fact has been determined by the president of the Oregon State Board of Horticulture that a dangerous potato disease known as the Powdery Scab of Potatoes (Spongospora subterranea), new to and not heretofore widely prevalent or distributed within and throughout the State of Oregon, exists in the County of Tillamook in the State of Oregon:

Now, therefore, I, Chas. A. Park, president of the Oregon State Board of Horticulture, under the authority conferred by Section 2, of Chapter 246 of the General Laws of 1915, and Section 4, of Chapter 342 of the General Laws of 1915, do hereby quarantine the said County of Tillamook, and from and after the publication of this notice in a newspaper published within said County of Tillamook, it shall be unlawful for any person, firm or corporation to carry or transport any common potato or potatoes from the said County of Tillamook into or through any part of the State of Oregon, outside of said County of Tillamook.

Done at Salem, Oregon, July 13, 1915.

CHAS. A. PARK,
President of the Oregon State Board of Horticulture.

Executive Office, Salem, Oregon, July 13, 1915.

I, James Withycombe, Governor of the State of Oregon, do hereby approve the foregoing notice of quarantine and designate the Tillamook Headlight, a newspaper published in said County of Tillamook, as the newspaper in which said notice shall be published.

JAMES WITHYCOMBE,
Governor of the State of Oregon.

Recent reports of the investigations of the Federal Horticultural Board lead me to believe that this quarantine against the shipment of potatoes from Tillamook County may soon be annulled without serious detriment to the potato industry of the State.

California Tuber Moth of the Potato

For several years past, there have been shipped to Oregon from outside states potatoes which were infested with tuber moth. Since Oregon was free from this pest, and the introduction of tuber moth into this State would cause a great economic loss to the potato growers, it was found necessary to issue two quarantine regulations. These regulations were issued after the most careful consideration of the matter of protecting our own people from a new and serious pest, and were not promulgated from any spirit of animosity. Since the declaration of the quarantine, there has been no cause for complaint against any shipment of potatoes which came into this State with the certificate of the California inspector. The quarantine regulations as above referred to, are herewith set out in full:

Oregon State Board of Horticulture, Notice of Quarantine No. 3

The fact has been determined by the president of the Oregon State Board of Horticulture that a dangerous insect pest, injurious to the common potato, which is commonly known as the potato tuber moth or potato tuber worm (Pythorimoea operculella, Zell.), new to and not heretofore prevalent or widely distributed within and throughout the State of Oregon, exists and is widespread in the State of California, and that, to prevent the introduction and spread of said pest in the State of Oregon, it is necessary to forbid the importation of potatoes from California, except under the conditions hereinafter set forth:

Now, therefore, I, Chas. A. Park, president of the Oregon State Board of Horticulture, under the authority conferred by Section 1 of Chapter 246 of the General Laws of Oregon of 1913, and Section 4 of Chapter 342 of the General Laws of Oregon of 1915, do hereby prohibit the importation of any common potato or potatoes from the State of California into the State of Oregon, except under the conditions hereinafter specified, and from and after the publication of this notice in three newspapers published in the State of Oregon it shall be unlawful for any person, firm or corporation to transport or bring any common potatoes from the State of California into the State of Oregon except under the following conditions:

1. Every shipment of common potatoes from the State of California to the State of Oregon must be accompanied by a certificate of inspection signed by a county horticultural commissioner or other duly authorized horticultural inspector of said State of California, certifying that he has inspected the potatoes in said shipment and found them free from the potato tuber moth, its larvae or pupa. Such certificate shall be signed in writing and shall specify the locality where said potatoes are grown; the date of inspection, and the number of sacks, boxes or other containers included in the shipment inspected.

2. Every shipment of potatoes grown in California which is brought into Oregon must be brought to the city of Portland, and must be held at the wharf, dock, railroad yards, freight depot or express company's depot or office of the common carrier bringing such potatoes into the State until said potatoes have been inspected by the State Inspector of the Oregon State Board of Horticulture or by some other duly authorized inspector working under direction of the said State Board of Horticulture, and permission has been given by the inspector making such inspection to deliver the potatoes. The common carrier, person,

firm or corporation bringing potatoes into Oregon which are grown in California must notify the State Board of Horticulture or the State inspector of said board of the arrival in Portland of such potatoes and hold the shipment as hereinbefore provided.

3. If, upon inspection, any of the potatoes in any shipment are found to be infested with the potato tuber moth, its larvae or pupa, or show indications that they have been so infested, the person, firm, or corporation who has brought said shipment of potatoes from California to this State must take said shipment of potatoes back to California within four days from the date of inspection of said potatoes in Portland, provided that if the infestation shall be in such condition that the inspector believes there would be danger of escape of the potato tuber moth from the shipment in course of transit through the State, the person, firm or corporation bringing the shipment into the State will be required to destroy the shipment, including the containers, by burning the same.

Done at Salem, Oregon, this twentieth day of January, 1916.

CHAS. A. PARK,
President of the Oregon State Board of Horticulture.

I, James Withycombe, Governor of the State of Oregon, do hereby approve the foregoing promulgation.

JAMES WITHYCOMBE,
Governor of the State of Oregon.

The foregoing regulations have been modified so as to permit the bringing of potatoes grown in California to the following additional points in Oregon for inspection: Astoria, Salem, Eugene, Roseburg, Medford, Klamath Falls, Lakeview.

White Pine Blister Rust

Within the past few years a disease known as the White Pine Blister Rust has established itself in the eastern portion of the United States where it is doing great damage to all five-leafed pines. Oregon's forests of five-leafed pines, including the western white pine and the sugar pine, are of immense value. For the protection of these forests it appeared necessary to prohibit the importation of five-leafed pines from any locality not known to be free from this disease. It was necessary to include in this prohibition all varieties of currant and gooseberry bushes, as they are subject to the disease. The following quarantine was therefore established:

Oregon State Board of Horticulture, Notice of Quarantine No. 4

The fact has been determined by the President of the Oregon State Board of Horticulture that a dangerous disease of pine trees, known as the White Pine Blister Rust (Peridermium strobi, Klebahn), not heretofore prevalent in nor distributed within the State of Oregon, exists in many foreign countries and throughout a large portion of the United States east of the Mississippi River, which disease attacks all five-leafed pines and all currant and gooseberry plants:

Now, therefore, I, Chas. A. Park, president of the Oregon State Board of Horticulture, under authority conferred by Section 1, of Chapter 246, of the General Laws of 1913, do hereby prohibit the importation from any and all foreign countries and from all portions of the United States east of the Mississippi River, of all trees of five-leafed pines and of all species and genera of currant and gooseberry plants and cuttings.

The best known five-leafed pines are Pinus strobus, white pine; P. monticola, Western white pine; P. lambertiana, sugar pine; P. flexilis, limber pine; P. albicaulis, white-bark pine; P. strobiformis, Mexican white pine; P. balfouriana, foxtail pine; P. aristata, bristlecone pine; P. cembroides, pinon pine; P. excelsa, Himalayan pine; P. Peuce, Balkan pine; P. armandi, Chinese white pine; P. parviflora, Japanese white pine; P. cembra, stone pine; P. koriensis, Korean pine.

Done at Salem, Oregon, this twenty-fourth day of July, 1916.

CHAS. A. PARK,
President of the Oregon State Board of Horticulture.

I, James Withycombe, Governor of the State of Oregon, do hereby approve the foregoing promulgation.

JAMES WITHYCOMBE,
Governor of the State of Oregon.

Executive Office, Salem, Oregon, July 24, 1916.

CHAS. A. PARK,
President and Commissioner for Second District.

Salem, Oregon, December 30, 1916.

Notice of Quarantine No. 5

It is a matter of common knowledge that an injurious insect pest, the alfalfa weevil (phytonomus posticus), exists in the States of Utah, Wyoming and Idaho, which insect pest is not yet prevalent nor yet found within the State of Oregon, but which, if introduced would cause great loss to growers of alfalfa, clover and similar plants, and it has been determined by the president of the Oregon State Board of Horticulture that it is necessary to prohibit the importation into the State of Oregon from the infested states of all articles which are naturally, or are liable to be, the host of said alfalfa weevil.

Now, therefore, I, Chas. A. Park, President of the Oregon State Board of Horticulture, do hereby declare that in order to prevent the introduction of said alfalfa weevil into Oregon it is necessary to prohibit the importation into the State of Oregon from the States of Utah, Wyoming and Idaho of all kinds of hay and straw, including hay, straw, grass, forage plants, weeds or tule used in cattle cars or used in packing nursery stock of any kind, or in connection with hives of bees, or in any other way, and hereafter and until further notice such importations from the States of Utah, Wyoming and Idaho are prohibited.

Done at the office of the Oregon State Board of Horticulture, Portland, Oregon, August 8, 1919.

(Signed) CHAS. A. PARK,
President of the Oregon State Board of Horticulture.

Executive Office, Salem, Oregon, August 8, 1919.

I, Ben W. Olcott, Governor of the State of Oregon, do hereby approve the foregoing promulgation and designate the following three newspapers in the State of Oregon as the newspapers in which said promulgation shall be published: Argus, Ontario, Oregon; Oregon Journal, Portland, Oregon; Oregon Statesman, Salem, Oregon.

(Signed) BEN W. OLCOTT,
Governor of the State of Oregon.

Notice of Quarantine No. 6

The fact has been determined by the president of the Oregon State Board of Horticulture that a dangerous insect pest, injurious to pears, prunes and other fruit trees, which is commonly known as the pear thrips (Taneothips inconsequens), new to and not heretofore widely prevalent or distributed within and throughout the State of Oregon, exists in the counties of Linn, Marion and Polk in the State of Oregon:

Now, therefore, I, Chas. A. Park, President of the Oregon State Board of Horticulture, under the authority conferred by Section 2 of Chapter 246 of the General Laws of Oregon of 1913, and Section 4 of Chapter 342 of the General Laws of Oregon of 1915, do hereby quarantine the counties of Linn, Marion and Polk in the State of Oregon, and, from and after the publication of this notice in three newspapers published in one each of said counties, it shall be unlawful for any person, firm or corporation to transport any fruit trees, nut trees, shrubs, plants, and all trees and nursery stock which may be a host of the pear thrips from any of said counties of Linn, Marion and Polk in the State of Oregon, into or through any part of the State of Oregon, outside of said counties of Linn, Marion and Polk, except under the following conditions:

Every shipment of trees, shrubs, plants, nursery stock and any host of the pear thrips from any of the counties of Linn, Marion and Polk in the State of Oregon, must have all soil particles removed from the same before being offered and accepted for shipment, and that during the period of activity of the pear thrips all such trees, shrubs, plants, nursery stock and any host of the pear thrips before being offered and accepted for shipment shall be dipped in the following solution or its equivalelnt:

Miscible Oil No. 2	5 gallons
Black Leaf 40	1 pint
Water	200 gallons

Done at Salem, Oregon, this seventeenth day of November, 1919.

(Signed) CHAS. A. PARK,
President of the Oregon State Board of Horticulture.

I, Ben W. Olcott, Governor of the State of Oregon, do hereby approve the foregoing promulgation and designate Albany Democrat, published in Albany, Linn County, Oregon; Oregon Statesman, published in Salem, Marion County, Oregon; Polk County Observer, published in Dallas, Polk County, Oregon, as the newspapers in which said notice shall be published.

(Signed) BEN W. OLCOTT,
Governor of the State of Oregon.

Notice of Quarantine No. 7

The fact has been determined by the President of the Oregon State Board of Horticulture that an injurious insect pest, the alfalfa weevil (Phytonomus Posticus), new to and not heretofore widely prevalent or distributed within or throughout the State of Oregon, exists in that portion of Malheur County, Oregon, hereinafter described.

Now, therefore, I, Chas. A. Park, President of the Oregon State Board of Horticulture, under the authority conferred by Section 2, of Chapter 246, of the General Laws of 1913, and Section 4, of Chapter 342, of the General Laws of

1915, do hereby quarantine that portion of Malheur County, Oregon, described as follows: Beginning at a point in Malheur County, Oregon, where the township line running between range 41 and 42 east intersects the north boundary line of Malheur County, Oregon; thence south on said township line to the southwest corner of township 17 south, range 42 east; thence east on the township line running between townships 17 and 18 south to the southwest corner of township 17 south, range 44 east; thence south to the southwest corner of township 20 south, range 44 east; thence east to the state boundary line between the states of Oregon and Idaho; thence northerly following said boundary line along the meanders of the Snake River to the place where the north boundary line of said Malheur County intersects said Snake River, thence westerly along the north boundary line of said Malheur County to the place of beginning. And from and after the publication of this notice in a newspaper published within the county of Malheur, it shall be unlawful for any person, firm or corporation to carry or transport any kinds of hay and straw, including hay, alfalfa hay products, straw, grass, forage plants, weeds or tule used in cattle cars or used for packing nursery stock of any kind or in any other way from said portion of Malheur County into or throughout any part of the State of Oregon, outside of said described portion of Malheur County except under the conditions hereinafter set forth, as follows:

1. Alfalfa meal or other finely ground products made from alfalfa hay, provided that the grinding of such products shall be done between the date of October 1 to April 1, may be shipped into or through any part of the State of Oregon under the following provisions:

(a) That all such products shall be sacked and shipped in new, clean sacks.

(b) That the product shall be stored in warehouses removed from alfalfa fields, alfalfa hay, or other suspected materials immediately after being ground, until shipped or otherwise disposed of.

(c) Provided further, that shipments of alfalfa meal or other such ground products designated for points in the State of Oregon shall be shipped to only such points as designated by the Oregon State Board of Horticulture or its duly authorized agent.

(d) All warehouses and places where said product is stored to be at all times free of alfalfa hay, other hays, straw and all other means of contamination.

(e) Each lot shipment must be accompanied by an official certificate signed in writing by an horticultural commissioner of the State of Oregon or his duly authorized agent attesting that it has been inspected and passed in compliance with these regulations, and stating where it was ground, stored, inspected and point of shipment.

Done at the office of the Oregon State Board of Horticulture, Portland, Oregon, October 5, 1920.

CHAS. A. PARK,

President of the Oregon State Board of Horticulture.

Executive Office, Salem, Oregon, October 5, 1920.

I, Ben W. Olcott, Governor of the State of Oregon, do hereby approve the foregoing promulgation and designate the Argus, a newspaper published in Ontario in said County of Malheur, as the newspaper in which said notice shall be published.

BEN W. OLCOTT,

Governor of the State of Oregon.

United States Department of Agriculture, Notice of Quarantine No. 26

The fact has been determined by the Secretary of Agriculture that it is necessary, in order to prevent the further spread of a dangerous plant disease known as the White Pine Blister Rust (Peridermium strobi Kleb.), not heretofore widely prevalent or distributed within and throughout the United States, to quarantine all states east of and including the states of Minnesota, Iowa, Missouri, Arkansas and Louisiana.

Now, therefore, I, David F. Houston, Secretary of Agriculture, under the authority conferred by Section 8 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), as amended by the Act of Congress approved March 4, 1917 (Public No. 390, 64th Congress), do hereby quarantine all the states east of and including the states of Minnesota, Iowa, Missouri, Arkansas and Louisiana, and by this Notice of Quarantine No. 26 do order that no five-leafed pines, or currant or gooseberry plants (Ribes and Grossularia) shall be moved or allowed to move interstate to points outside the quarantined area; and, further, that no five-leafed pines or black currant plants shall be moved or allowed to move interstate to points outside the area comprising the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut and New York.

Restrictions now or hereafter enforced by any state on the entry into such state of the plants named in this quarantine are in no wise affected by this quarantine.

This quarantine shall not apply to the movement by the United States Department of Agriculture of the plants named for experimental or scientific purposes.

This notice of quarantine shall become and be effective on and after June 1, 1917.

Done at Washington this twenty-first day of April, 1917.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

United States Department of Agriculture, Amendment No. 1 to Notice of Quarantine No. 26

The fact has been determined by the Secretary of Agriculture that it is necessary, in order to prevent the further spread of a dangerous plant disease known as the White Pine Blister Rust (Peridermium strobi Kleb.), not heretofore widely prevalent or distributed within and throughout the United States, to quarantine immediately the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

Now, therefore, I, David F. Houston, Secretary of Agriculture, under the authority conferred by Section 8 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), as amended by the Act of Congress approved March 4, 1917 (Public No. 390, 64th Congress), do hereby amend Notice of Quarantine No. 26, promulgated April 21, 1917, effective on and after June 1, 1917, and by this amendment do order that from and after the date hereof no five-leafed pines or black currant plants shall be moved or allowed to move interstate to points outside the area comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

Done at Washington this first day of May, 1917.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

United States Department of Agriculture, Notice of Quarantine No. 37, With Regulations

Quarantine No. 37 with regulations, governing the entry of nursery stock and other plants and seeds, supersedes, on and after June 1, 1919, the regulations now in force governing the importation of nursery stock, and brings under restrictions all other plants and plant products for or capable of propagation.

Regulation 2 under this quarantine provides that fruits, vegetables, cereals and other plant products for or capable of propagation, intended for medicinal, food or manufacturing purposes and field, vegetable and flower seeds, may be imported without permit or other restrictions.

Regulation 3 enumerates the classes of plants which may be imported for propagation under permit and on compliance with the other requirements of the regulations. These classes comprise certain bulbs, rose stocks, fruit stocks, including cuttings, scions and buds, and seeds of nut, fruit, forest and other ornamental and shade trees and of hardy perennial ornamental shrubs. The entry of these classes of nursery stock and other plants and seeds is represented by experts to be essential to the floriculture and horticulture of this country under existing conditions.

The entry of plants or classes of plants or plant products for or capable of propagation, not specifically provided for in regulations 2 and 3, from any foreign locality or country is restricted to importations by the United States States Department of Agriculture for experimental or scientific purposes.

This quarantine does not affect the status of nursery stock and other plants and seeds covered by special quarantine and other restrictive orders now in force.

The regulations governing the entry of the classes of plants listed in regulation 3 are similar to those hitherto in force and take into account the classification of countries into (1) those maintaining inspection and certification of nursery stock in accordance with the requirements of the plant quarantine act, and (2) countries which have not made provision for such compliance with the act. (See Appendix C.)

C. L. MARLATT,
Chairman, Federal Horticultural Board.

United States Department of Agriculture, Notice of Quarantine No. 37

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that there exists in Europe, Asia, Africa, Mexico, Central and South America, and other foreign countries and localities, certain injurious insects and fungous diseases new to and not heretofore widely distributed within and throughout the United States, which affect and are carried by nursery stock and other plants and seeds, the words "nursery stock and other plants and seeds" including, wherever used in this notice and the rules and regulations supplemental hereto, field grown florists' stock, trees, shrubs, vines, cuttings, grafts, scions, buds, fruit pits and other seeds of fruit and ornamental trees or shrubs, also field, vegetable and flower seeds, bedding plants, and other herbaceous plants, bulbs and roots, and other plants and plant products for, or capable of, propagation.

Now, therefore, I, D. F. Houston, Secretary of Agriculture, under the authority conferred by the Act of Congress approved August 20, 1912 (37 Stat., 315), do hereby declare that it is necessary, in order to prevent the further introduction into the United States of injurious insect pests and fungous diseases, to forbid, except as provided in the rules and regulations supplemental hereto, the importation into the United States of nursery stock and other plants and seeds from the foreign countries and localities named and from any other foreign locality or country.

On and after June 1, 1919, and until further notice, by virtue of said Act of Congress approved August 20, 1912, the importation of nursery stock and other plants and seeds from the above named and all other foreign countries and localities, except as provided in the rules and regulations supplemental hereto, is prohibited.

This quarantine shall not apply to nursery stock and other plants and seeds covered by special quarantines and other restrictive orders now in force, a list of which is given in Appendix A of the rules and regulations supplemental hereto, nor to the importation by the United States Department of Agriculture of nursery stock and other plants and seeds for experimental or scientific purposes.

Done in the District of Columbia this 18th day of November, 1918.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

Rules and Regulations Supplemental to Notice of Quarantine No. 37 Governing the Importation of Nursery Stock and Other Plants and Seeds In to the United States.

(Effective on and after June 1, 1919, and superseding the regulations heretofore issued governing the importation of nursery stock.)

Regulation 1. Definition. The words "nursery stock and other plants and seeds" are used throughout these rules and regulations in the same sense as in Notice of Quarantine No. 37.

Ruglation 2. Nursery Stock and Other Plants and Seeds for Which Permit Is Not Required. The following classes of nursery stock and other plants and seeds, not including, however, the particular nursery stock and other plants and seeds named in Appendix A, which are governed by special quarantines and other restrictive orders now in force, nor such as may hereafter be made the subject of special quarantines, may be imported without permit or other compliance with these regulations:

(1) Fruits, vegetables, cereals, and other plant products imported for medicinal, food or manufacturing purposes.

(2) Field, vegetable and flower seeds.

Regulation 3. Nursery Stock and Other Plants and Seeds for Which Permit Is Required. The following nursery stock and other plants and seeds, not including, however, those named in Appendix A, which are governed by special quarantines and other restrictive orders now in force, nor such as may hereafter be made the subject of special quarantines, when free from sand, soil or earth, may be imported from countries which maintain inspection (see Appendix C), under permit upon compliance with these regulations, but, where a particular purpose is specified, for that purpose and no other:

(1) Lily bulbs, lily of the valley, narcissus, hyacinths, tulips and crocus.

(2) Stocks, cuttings, scions and buds, of fruits for propagation.

(3) Rose stocks for propagation, including Manetti, Multiflora, Brier Rose and Rosa Rugosa.

(4) Nuts, including palm seeds, for propagation.

(5) Seeds of fruit, forest, ornamental and shade trees, seeds of deciduous and evergreen ornamental shrubs and seeds of hardy perennial plants.

Importations of nursery stock and other plants and seeds specified in this regulation, from countries not maintaining inspection, may be made under permit upon compliance with these regulations in limited quantities for experimental purposes only, but this limitation shall not apply to tree seeds.

Regulation 4. Application for Permits for Importation of Nursery Stock and Other Plants and Seeds. Persons contemplating the importation of nursery stock and other plants and seeds* the entry of which is permitted under Regulation 3 shall first make application to the Federal Horticultural Board for a permit, stating in the application the exact designation of the nursery stock and other plants and seeds to be imported, the name and address of the exporter, the country and locality where grown, the port of entry, and the name and address of the importer in the United States to whom the permit should be sent.

Applications for permits should be made in advance of the proposed shipments, but if through no fault of the importer a shipment should arrive before a permit is received the importation will be held in customs custody at the risk and expense of the importer for a period not exceeding twenty days pending the receipt of the permit.

Applications may be made by telegraph, in which case the information required above must be given.

Permits are not required for nursery stock and other plants and seeds, not under quarantine or regulation, entering the United States for immediate transportation in bond to foreign countries.

Applications for permits to import nursery stock and other plants and seeds from countries which do not maintain inspection must contain a definite statement of the quantity to be imported.

Regulation 5. Delivery in Bond Pending Receipt of Permit Will Be Allowed for Shipments From Countries Maintaining Inspection. If the required permit be not at hand upon arrival of a shipment from a country which maintains inspection, and such shipment meets the requirements of Regulations 7 and 8, it may be delivered to the importer, consignee or agent for the proper care thereof upon the filing of a bond with approved sureties in double the invoice value (but in no case less than $20.00), the condition of which shall be that the importation shall not be removed from the port of entry but shall be redelivered to the collector of customs within twenty days from the date of arrival at the port, unless in the meantime the collector is presented with a proper permit; or, if the importer, consignee or agent shall so elect, the goods may, so far as the Department of Agriculture is concerned, be retained in customs custody for a period not exceeding twenty days, pending the issuance of the permit, wholly at the risk and expense of the importer.

Regulation 6. Issuance of Permits. On approval by the Secretary of Agriculture of an application for the importation of nursery stock and other plants and seeds a permit will be issued in quadruplicate. One copy will be furnished to the applicant for presentation to the customs officer at the port of entry, one copy will be mailed to the collector of customs and one to the inspector of the Department of Agriculture at the port of entry, and the fourth will be filed with the application.

Permits shall be valid until revoked unless otherwise specified therein and will be issued for the ports of Boston, New York, Newark, San Francisco, Seattle, and such other ports as may from time to time be approved by the Federal Horticultural Board. The permit will be addressed to the collector of customs at the port for which it is issued.

Regulation 7. Inspection, Certification and Marking as a Condition of Entry. The importation of nursery stock and other plants and seeds from countries which maintain inspection will not be allowed unless the invoice is accompanied by an original certificate, and unless each container bears a copy certificate, issued by a duly authorized official of the country from which it is exported, stating that

* A postoffice order dated May 27, 1913, as amended December 16, 1913, prohibits the importation by mail of all growing or living plants, seeds and other plant products for propagation, except field, vegetable and flower seeds.

the nursery stock and other plants and seeds covered by the certificate have been thoroughly inspected by him or under his direction and found, or believed to be, free from injurious plant diseases and insect pests. Nursery stock and other plants and seeds exported between October 1 and May 31 shall be inspected on or after the 1st of October, and those exported between June 1 and September 30 shall be inspected at the time of packing; provided, that for tropical and semi-tropical countries, or for stock grown under glass, the inspection shall be at time of packing throughout the entire year.

Nursery stock and other plants and seeds from countries which do not maintain inspection shall not be delivered to the importer or consignee until they have been examined by an inspector of the Department of Agriculture and found to be free from plant diseases and insect pests, or, if infested, capable in the judgment of the inspector of being adequately safeguarded by disinfection. All importations under this paragraph must also comply with the disinfection requirements of Regulation 9. Nursery stock and other plants and seeds inspected as provided herein, which are found to be carrying any plant disease or insect pest, and which, in the judgment of the inspector can not be cleaned by disinfection or treatment, shall be refused entry. All charges for storage, cartage and labor incident to inspection and disinfection, other than the services of the inspector, shall be paid by the importer.

If a package of nursery stock and other plants and seeds offered for entry includes any prohibited article, the entire package will be refused entry.

Each case, box or other container or covering of nursery stock and other plants and seeds offered for entry shall be plainly and correctly marked to show the number of the permit, the general nature and quantity of the contents, the district or locality and country where grown, the name and address of the exporter, and the name and address of the consignee.

Regulation 8. Foreign Certificate of Inspection. Each certificate and copy certificate shall give the date of inspection; name of the grower or exporter; the district or locality and the country where grown; and a statement that the nursery stock and other plants and seeds have been inspected by a duly authorized official and found, or believed to be, free from insect pests and plant diseases. The original certificate shall be signed and sealed by, and the copy certificate shall bear the seal of, a responsible inspection official of the country of origin.

Lists of officials in foreign countries authorized to inspect nursery stock and other plants and seeds, giving their names and official designations, will be furnished to collectors of customs through the Secretary of the Treasury.

Regulation 9. Disinfection a Condition of Entry. Nursery stock and other plants and seeds imported under Regulation 3 shall be subject, as a condition of entry, to such disinfection as shall be required by the inspector of the Department of Agriculture. When disinfection is required, the nursery stock and other plants and seeds involved will be deliverd to the permittee for disinfection upon the filing with the collector of customs of a bond in the amount of $5,000.00, or in an amount equal to the invoice value if such value be less than $5,000.00, with approved sureties, the condition of which shall be that the nursery stock and other plants and seeds shall be disinfected under the supervision of an inspector of the Department of Agriculture; that no case or other container thereof shall be broken, opened or removed from the port of entry unless and until a written notice is given to such collector by an inspector of the Department of Agriculture that the nursery stock and other plants and seeds have been properly disinfected; and that the importation shall be redelivered to the collector of customs within forty days from arrival at the port of entry.

Regulation 10. Notice of Arrival by Permittee. Immediately upon arrival of the nursery stock and other plants and seeds at the port of entry, the permittee shall submit in duplicate notice to the Secretary of Agriculture, through the

collector of customs, on forms provided for that purpose, stating the number of the permit, date of entry, name of ship or vessel, the country and locality where grown, name of the foreign shipper, number of cases and marks and numbers on cases, the general nature and quantity of the nursery and other plants and seeds, the port of entry, and the name of the importer or broker at the port of entry.

Regulation 11. Notice of Shipment by Permittee. After entry of the nursery stock and other plants and seeds and before removal from the port of entry for each separate shipment or consignment thereof the permittee shall notify the Secretary of Agriculture in duplicate, on forms provided for that purpose, stating the number of the permit, the date of entry, the port of entry, the customs entry number, name and address of the consignee to whom it is proposed to forward the shipment, the general nature and quantity of the nursery stock and other plants and seeds, the number of cases or other containers included in the shipment, and the case or container numbers and marks, together with the probable date of delivery for and route of transportation. A separate report is required for each ultimate consignee.

At the same time a copy of the notice to the Secretary of Agriculture shall be sent by the permittee to the duly authorized inspector or other officer of the state, territory, or district to which the nursery stock and other plants and seeds are to be shipped. A list of such inspectors and officers is appended.

Should a consignee named in such a notice ship or deliver for shipment to any other state, territory, or district, such nursery stock and other plants or seeds before they have been inspected by a duly authorized state, territorial, or district inspector or officer, he shall, prior to such shipment, give like notices to the Secretary of Agriculture and to the duly authorized inspector or other officer of the state, territory or district to which the nursery stock and other plants and seeds are to be reshipped.

Nursery stock and other plants and seeds which have been once inspected and passed by a duly authorized state, territorial, or district inspector or other officer, will be allowed to move interstate without restrictions other than those imposed on the interstate movement of domestic nursery stock.

Regulation 12. Marking a Condition of Interstate Shipment of Nursery Stock and Other Plants and Seeds Not Inspected. No person shall ship or deliver for shipment from one state, territory or district of the United States into any other state, territory or district any imported nursery stock and other plants and seeds the case, box, package, crate, bale or bundle whereof is not plainly marked so as to show the general nature and quantity of the contents, the name and address of the consignee, and the country and locality where grown, unless and until such imported nursery stock and other plants and seeds have been inspected and passed by the proper official of a state, territory or district of the United States.

Regulation 13. Cancelation of Permits for Violation of Regulations. Permits may be canceled and further permits refused for the importation of the products of any grower or exporter who has violated the Plant Quarantine Act or any rules and regulations promulgated thereunder, or for the importation of the products of any country whose inspection is found by the Federal Horticultural Board as the result of its examinations of importations therefrom to be merely perfunctory, or for the failure of a permittee to give any notice required by these rules and regulations, or for the giving of a false or incomplete notice or the mislabeling of any shipment with intent to evade any provision of the Plant Quarantine Act or any rules and regulations thereunder.

Regulation 14. These regulations shall not apply to the importation by the United States Department of Agriculture of nursery stock and other plants and seeds for experimental or scientific purposes.

The above rules and regulations are hereby adopted and shall be effective on and after June 1, 1919, and shall supersede the rules and regulations governing the importation of nursery stock into the United States, which were promulgated to take effect on and after July 1, 1916.

D. F. HOUSTON,
Secretary of Agriculture.

November 18, 1918.

APPENDIX A

The entry of the following plants and plant products is prohibited or restricted by specific quarantines and other restrictive orders now in force:

(a) Irish potatoes from all countries except the Dominion of Canada and Bermuda. Irish potatoes may be imported from any foreign country into the Territories of Hawaii and Porto Rico, for local use only, free from any restrictions under the Plant Quarantine Act.

(b) Oranges, sweet limes, grapefruit, mangoes, achras sapotes, peaches, guavas, and plums from the Republic of Mexico.

(c) All five-leafed pines and all species and varieties of the genera Ribes and Grossularia, from each and every country of Europe and Asia and from the Dominion of Canada and Newfoundland.

(d) Cotton seed (including seed cotton) of all species and varieties, and cottonseed hulls, from any foreign locality and country.

(e) Seeds of the avocado or alligator pear from Mexico and the countries of Central America.

(f) Living canes of sugar cane or cuttings or parts thereof from all foreign countries. There are no federal restrictions on the entry of such materials into Hawaii and Porto Rico.

(g) All citrus nursery stock including buds, scions, and seeds, from all foreign localities and countries.

(h) All pines not included in paragraph (c) from all European countries and localities.

(i) Seed and all other portions in the raw or unmanufactured state of Indian corn or maize (Zea mays L.), and the closely related plants, including all species of Teosinte (Euchlaena), Job's tears (Coix), Polytoca, Chionachne, and Sclerachne, from Southeastern Asia (including India, Siam, Indo-China, and China), Malayan Archipelago, Australia, New Zealand, Oceania, Philippine Islands, Formosa, Japan, and adjacent islands.

(j) All species and varieties of citrus fruits from eastern and southeastern Asia (including India, Siam, Indo-China, and China), the Malayan Archipelago, the Philippine Islands, Oceania, (except Australia, Tasmania, and New Zealand), Japan (including Formosa and other islands adjacent to Japan), and the Union of South Africa.

(k) All varieties of sweet potatoes and yams (Ipomoea batatas and Dioscorea spp.) from all foreign countries and localities.

(l) All species or varieties of banana plants (Musa spp.) from all foreign countries and localities.

(m) Fruits of the avocado or alligator pear and avocado nursery stock less than 18 months of age from Mexico and the countries of Central America.

(n) Cotton from all foreign countries and localities.

(o) Cottonseed oil from Mexico and cottonseed cake, meal, and all other cottonseed products, except oil, from all foreign countries.

(p) All varieties of bamboo seed, plants, or cuttings thereof, capable of propagation, including all genera and species of the tribe Bambuseae, from all foreign countries.

APPENDIX B

Forms Required by the Foregoing Regulations.
(These will be furnished on application.)

UNITED STATES DEPARTMENT OF AGRICULTURE

Federal Horticultural Board,
Washington, D. C.

Application for permit to import nursery stock and other plants and seeds.

....., 19.....

To the Federal Horticultural Board, Washington, D. C.

Sirs: A permit is requested for the importation of the following nursery stock and other plants and seeds:

Exact designation of nursery stock and other plants and seeds to be imported. (If from a country which does not maintain inspection the exact quantity to be imported must be given.)

.....
.....
.....
.....
.....
.....

Name and address of exporter .....

Country where grown .....
Locality where grown .....
Port of entry .....
Name and address of person (either applicant or his agent or broker) to whom permit should be mailed .....

Very respectfully,

.....
(Name of applicant)

.....
(Address)

UNITED STATES DEPARTMENT OF AGRICULTURE
Federal Horticultural Board,
Washington, D. C.

Permit to import nursery stock and other plants and seeds.
(Valid until revoked)

....., 19.....

To the Collector of Customs .....

You are hereby authorized, so far as the jurisdiction of the Department of Agriculture is concerned, to permit the entry under the plant quarantine act, approved August 20, 1912, of the nursery stock and other plants and seeds described below, in accordance with the rules and regulations supplemental to notice of quarantine No. 37 governing the importation of nursery stock and other plants and seeds into the United States, effective on and after June 1, 1919.

Exact designation of nursery stock and other plants and seeds to be imported.

.....
.....
.....
.....
.....
Name and address of exporter .....
Country and locality where grown .....
Name and address of importer .....
.....

Respectfully,
D. F. HOUSTON, Secretary of Agriculture.

Countersigned:

.....
Chairman of board.

.....
In charge of entry of plants and plant products under restriction.

Customs Entry No.....

Importer's or broker's report of arrival of nursery stock and other plants and seeds.

In accordance with Section 2 of the plant quarantine act of August 20, 1912, and Regulation 10 of the rules and regulations supplemental to notice of quarantine No. 37 governing the importation of nursery stock and other plants and seeds into the United States, approved November 18, 1918, the information provided for in this blank must be given to the Secretary of Agriculture, Washington, D. C., through the collector of customs where entry is made, immediately upon arrival of the nursery stock and other plants and seeds at the port of entry.

D. F. HOUSTON, Secretary of Agriculture.

....., ..., 19.....
(Port of entry)

The Federal Horticultural Board, Washington, D. C.

The following nursery stock and other plants and seeds imported under permit No..... shipped from ....., and consigned to ....., arrived ....., 19....., on .....
(Name of importer or broker at port of entry)
..... dock or .....
(Name of vessel or steamship line)
.....
(Name of railroad company)
Country and locality where grown .....
Foreign shipper .....
No. of cases..... Marks and numbers on cases.....
.....
Quantity
Kinds of Nursery Stock and Other Plants and Seeds

Compared with invoice and found correct, except as noted.

.....
(Importer or broker at port of entry)

.....
(Address)

.....
(Deputy collector)
Fumigation plant.....

Importer's or broker's notice of shipment of nursery stock and other plants and seeds.

....., 19.....

The Federal Horticultural Board, Washington, D. C.

The nursery stock and other plants and seeds described below, imported under permit No..... entered at the port of ....., ..., 19....., per steamship ....., are proposed to be shipped to .....,

(Name of consignee)

at....., on or about ....., 19....., via .....

(Address)

.....

(Name of railroad or steamship line)

No. of cases..... Marks and numbers on cases.....

.....

Quantity.

Kinds of Nursery Stock and Other Plants and Seeds.

(The above information is required in the case of each separate shipment.)

.....

(Name of importer or broker)

.....

Customs Entry No..... (Address)

APPENDIX C

List of the foreign countries which have provided for inspection and certification in conformity with the requirements of the plant quarantine act of August 20, 1912.

Australia
Barbados
Belgium
Bermuda
British Guiana
Canada
Cuba
Denmark
England
France
Germany
Guatemala
Holland
Hongkong
Ireland
Italy: Province of Padova (Padua) only
Jamaica
Japan
Leeward Islands:
Antigua
St. Christopher-Nevis
Dominica
Montserrat
Virgin Islands
Grand Duchy of Luxemburg
New Zealand
Philippine Islands
Scotland
Union of South Africa
Spain
Straits Settlements
Switzerland
Trinidad
Wales
Windward Islands:
Granada
St. Lucia
St. Vincent

APPENDIX D

STATE INSPECTION OFFICIALS

Alabama: State Horticulturist, Alabama State Board of Horticulture, Auburn, Ala.
Alaska: Agronomist in Charge, Alaska Agricultural Experiment Station, Sitka, Alaska.
Arizona: State Entomologist, Phoenix, Ariz.
Arkansas: State Inspector, Fayetteville, Ark.
California: Horticultural Quarantine Officer, Room 11, Ferry Bldg., San Francisco, Cal.
Colorado: State Entomologist, Colorado Agricultural Experiment Station, Fort Collins, Colo.
Connecticut: State Entomologist, New Haven, Conn.
Delaware: Secretary, State Board of Agriculture, Dover, Del.
District of Columbia: United States Department of Agriculture, Federal Horticultural Board.
Florida: State Plant Board of Florida, Ganesville, Fla.
Georgia: State Entomologist, Atlanta, Ga.
Guam: Special Agent in Charge, Guam Agricultural Experiment Station, Island of Guam (via San Francisco).
Hawaii: Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.
Idaho: State Horticultural Inspector, Boise, Idaho.
Illinois: Chief Inspector, Office State Entomologist, Urbana, Ill.
Indiana: State Entomologist, Indianapolis, Ind.
Iowa: State Entomologist, Iowa State College, Ames, Iowa.
Kansas, North: State Entomologist, Kansas State Agricultural College, Manhattan, Kan.
Kansas, South: Entomologist, University of Kansas, Lawrence, Kan.
Kentucky: State Entomologist, Kentucky Agricultural Experiment Station, Lexington, Ky.
Louisiana: Entomologist, State Board of Agriculture and Immigration, Baton Rouge, La.
Maine: State Horticulturist, Augusta, Me.
Maryland: State Entomologist, College Park, Md.
Massachusetts: State Nursery Inspector, State House, Boston, Mass.
Michigan: State Inspector of Nurseries, East Lansing, Mich.
Minnesota: State Entomologist, St. Paul, Minn.
Mississippi: Entomologist, Agricultural College, Miss.
Missouri: Entomologist, University of Missouri, Columbia, Mo.
Montana: Montana State Board of Horticulture, Missoula, Mont.
Nebraska: State Entomologist, University of Nebraska, Lincoln, Neb.
Nevada: Director, Nevada Agricultural Experiment Station, Reno, Nev.
New Hampshire: Deputy Commissioner of Agriculture, Durham, N. H.
New Jersey: State Entomologist, New Brunswick, N. J.

New Mexico: Horticulturist, New Mexico Agricultural Experiment Station, State College, N. M.
New York: Commissioner of Agriculture, Albany, N. Y.
North Carolina: State Entomologist, State Department of Agriculture, Raleigh, N. C.
North Dakota: Director, North Dakota Agricultural Experiment Station, Agricultural College, N. D.
Ohio: Chief Inspector, Ohio Department of Agriculture, Columbus, Ohio.
Oklahoma: Secretary, State Board of Agriculture, Oklahoma City, Okla.
Oregon: Secretary, State Board of Horticulture, Portland, Ore.
Pennsylvania: Chief Nursery Inspector, Harrisburg, Pa.
Porto Rico: Entomologist, Board of Commissioners of Agriculture, Rio Piedras, P. R.
Rhode Island: Entomologist, Room 129, State House, Providence, R. I.
South Carolina: State Entomologist, Clemson College, S. C.
South Dakota: State Entomologist, South Dakota State College, Brookings, S. D.
Tennessee: State Entomologist, Knoxville, Tenn.
Texas: Chief Inspector of Nurseries, Houston, Tex.
Utah: State Crop Pest Inspector, Salt Lake City, Utah.
Vermont: State Nursery Inspector, Burlington, Vt.
Virginia: State Entomologist, Blacksburg, Va.
Washington: Commissioner of Agriculture, Olympia, Wash.
West Virginia: State Entomologist, Morgantown, W. Va.
Wisconsin: State Entomologist, State Capitol, Madison, Wis.
Wyoming: Secretary, State Board of Horticulture, Laramie, Wyo.

United States Department of Agriculture, Amendment No. 1 to Regulations Supplemental to Notice of Quarantine No. 37

Under authority conferred by the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), it is ordered that Regulation 3 of the Rules and Regulations Supplemental to Notice of Quarantine No. 37 Governing the Importation of Nursery Stock and Other Plants and Seeds into the United States, effective June 1, 1919, be and the same is hereby amended to read as follows:

Regulation 3. Nursery stock and other plants and seeds for which permit is required.

The following nursery stock and other plants and seeds, not including, however, those named in Appendix A, which are governed by special quarantines and other restrictive orders now in force, nor such as may hereafter be made the subject of special quarantines, when free from sand, soil or earth, may be imported from countries which maintain inspection (see Appendix C), under permit upon compliance with these regulations, but, where a particular purpose is specified, for that purpose and no other:

(1) Lily bulbs, lily of the valley, narcissus, hyacinths, tulips and crocus.

(2) Stocks, cuttings, scions and buds, of fruits for propagation.

(3) Rose stocks for propagation, including Manett, Multiflora, Brier Rose and Rosa Rugosa.

(4) Nuts, including palm seeds, for propagation.

(5) Seeds of fruit, forest, ornamental and shade trees, seeds of deciduous and evergreen ornamental shrubs and seeds of hardy perennial plants.

Provided, that the requirement as to freedom from sand, soil or earth shall not apply to sand, soil or earth used for packing the articles enumerated in item No. 1 of this regulation when such sand, soil or earth has been previously sterilized in accordance with methods prescribed by the Federal Horticultural Board under the supervision of a duly authorized inspector of the country of origin. Such sterilization shall be certified to by the duly authorized inspector of the country of origin.

Importations of nursery stock and other plants and seeds specified in this regulation, from countries not maintaining inspection, may be made under permit upon compliance with these regulations in limited quantities for experimental purposes only, but this limitation shall not apply to tree seeds.

Done in the District of Columbia this twelfth day of February, 1919.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

United States Department of Agriculture, Explanation of Provisions for Entry of Plant Novelties and Propagating Stock under Quarantine No. 37.

Regulation 14 of the regulations relative to the importation of nursery stock and other plants and seeds has been revised and reissued. In its new form it is essentially an interpretation of the old regulation 14, rather than an enlargement of powers under the quarantine, inasmuch as the regulation, as worded in the quarantine as originally issued, was intended to cover exactly what is now more clearly stated in the new regulation. This regulation provides for the importation under a special permit from the Secretary of Agriculture, of limited quantities of otherwise prohibited stock for the purpose of keeping the country supplied with new varieties of plants and stock for propagation purposes not available in the United States. This amendment, however, does not apply to a few plants which have been specifically prohibited entry under other quarantines, as, for example, pines, Ribes, and Grossularia from certain countries, and citrus, banana and bamboo stock.

The following explanations of regulation 14 are given to indicate the limitations under this regulation and the procedure to be followed in making importations of the two classes of plants specified, namely, new varieties and necessary propagating stock.

The expression "new varieties" is understood to mean plant novelties; that is, new horticultural or floricultural creations or new discoveries.

"Necessary propagating stock" is understood to mean stock of old or standard varieties imported for the multiplication of the plants in question as a nursery or florist enterprise as distinguished from importations for immediate or ultimate sale of the stocks actually imported, and such importations will be restricted to stocks which are not available in this country in adequate quantities.

The expression "limited quantities" used in regulation 14 is understood to mean with respect both to new varieties and to standard stocks, such quantities as will supply reasonable needs for the establishment of reproduction plants which may be thereafter independent of foreign supplies.

There is no limitation as to the number of permits for different plants or classes of plants under regulation 14, which an individual may request, but the applications will all be passed upon both as to necessity for the particular importation and as to the quantity adequate for the purpose intended, by experts of the department, for the information of the board prior to the issuance of the permits.

All importations under regulation 14 must be made under special permits through the office of Foreign Seed and Plant Introduction of the Department of Agriculture, but for the use of the individual importer. The importer will be required to meet all entry, transportation and freight handling charges. The department will make no charge for inspection and supervision. The necessary procedure for making such importation is as follows:

1. The Federal Horticultural Board will supply, on request, an application blank upon which request may be made for special permit to import. This application embodies an agreement on the part of the importer that if the imported material is found on examination by an inspector of the Department of Agriculture to be so infested or infected with insects or disease that it can not be adequately safeguarded, it may be destroyed and such destruction will not be made the basis of a claim against the Department of Agriculture for damages. The application must be accompanied by a statement certifying that the plants to be imported are novelties or if standard varieties of foreign plants, that stocks in adequate quantities for their propagation are not available in this country, and that in either case they are to be imported for the establishment of reproduction plantings and not for immediate or ultimate sale of the stocks actually imported. In exceptional cases the importation of novelties may be

made for personal use, but not for sale. The application must also give the name and address of the exporter, country and locality where the stock was grown, the name and address of the importer, and the name and address of the nursery or other establishment in which the plants are to be reproduced on release.

2. If the permit is issued, the applicant will be furnished shipping instructions and shipping tags to be forwarded with his order to the exporter. The plants will, in consequence, be addressed in bond to the United States Department of Agriculture, Bureau of Plant Industry, Washington, D. C., United States of America, and indorsed, "Foreign Seed and Plant Introduction, for (insert name of importer)," and arrangements must be made with some responsible agency in Washington for the clearance of the plants when received through the Custom House at Georgetown, D. C., together with the payment of all charges involved.

3. Upon clearance through the Georgetown Custom House, the material will be turned over to the office of Foreign Seed and Plant Introduction by the authorized agent of the importer, and in the specially equipped inspection houses and under expert care as to the welfare of the plants, be carefully examined by inspectors of the Federal Horticultural Board. If found free from dangerous insects or diseases, the shipment will be immediately and carefully repacked and forwarded by express, charges collect, to the importer.

4. Cleaning and disinfection will occur for slight infestation, but should the material be found to be so infected or infested with either disease or insects that it can not be so adequately safeguarded, it will either be destroyed, or, when possible and desirable, returned to the point of origin.

C. L. MARLATT,
Chairman of Board.

United States Department of Agriculture—Instructions for Sterilization of Sand, Soil or Earth Used for Packing Bulbs Imported Under Notice of Quarantine No. 37

Amendment No. 1 to the regulation supplemental to Notice of Quarantine No. 37, provides that the requirement of regulation 3 as to freedom from sand, soil or earth of nursery stock and other plants and seeds permitted entry under that regulation, shall not apply to sand, soil or earth used for packing the articles enumerated in item No. 1, when such sand, soil or earth has been previously sterilized in accordance with methods prescribed by the Federal Horticultural Board under the supervision of a duly authorized inspector of the country of origin.

The requirement as to sterilization may be met by heating the sand, soil or earth to a temperature of 100 degrees Centigrade (212 degrees Fahrenheit) and maintaining that temperature for a period of one hour. Such sterilization is accomplished at one of the field stations of this department by the use of a large iron receptacle holding about a cubic yard of soil. A fire is built under the receptacle and in a short period the contained earth is heated sufficiently to kill all larvae, nematodes, etc. It is necessary to keep the soil stirred while heating. Any device which will maintain the heat at the required temperature for one hour will be satisfactory to the board.

The invoice covering importations of bulbs packed in such sterilized sand, soil or earth must be accompanied by a certificate of a duly authorized inspector of the country of origin to the effect that the required sterilization has been accomplished under his direction. The certificate should indicate the marks and numbers on the cases and should contain such other information as may be necessary to identify the cases which it covers.

C. L. MARLATT,
Chairman of Board.

United States Department of Agriculture, Amendment No. 2 to Regulations Supplemental to Notice of Quarantine No. 37

Under authority conferred by the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), it is ordered that regulation 14 of the rules and regulations supplemental to Notice of Quarantine No. 37, Governing the Importation of Nursery Stock and Other Plants and Seeds into the United States, effective June 1, 1919 be, and the same is hereby, amended to read as follows:

Regulation 14. Special Permits for Importation in Limited Quantities of Prohibited Stock. Application may be made to the Secretary of Agriculture for special permits for the importation, in limited quantities and under safeguards to be prescribed in such permits, of nursery stock and other plants and seeds not covered by the preceding regulations, for the purpose of keeping the country supplied with new varieties and necessary propagating stock; provided, that this shall not apply to nursery stock and other plants and seeds covered by special quarantines and other restrictive orders now in force, nor to such as may hereafter be made the subject of special quarantines. A list of nursery stock and other plants and seeds covered by special quarantines and other restrictive orders now in force is given in Appendix A of these regulations.

Done in the District of Columbia this 27th day of March, 1919.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

United States Department of Agriculture, Quarantine on Account of Black Stem Rust, Notice of Quarantine No. 38

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that the common barberry (Berberis vulgaris) and its horticultural varieties, as well as other species of Berberis and Mahonia, are capable of harboring the black stem rust of wheat, oats, barley, rye and many wild and cultivated grasses. Through the cooperation of the Department of Agriculture with state officials, local organizations and individuals, susceptible species of barberry and Mahonia have been very largely eradicated from the States of Nebraska, Iowa, Illinois, Indiana, Ohio, North Dakota, South Dakota, Minnesota, Montana, Wisconsin, Michigan, Wyoming and Colorado.

Now, therefore, I, David F. Houston, Secretary of Agriculture, under the authority conferred by Section 8 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), as amended by the Act of Congress approved March 4, 1917 (39 Stat., 1134, 1165), do hereby quarantine, effective May 1, 1919, the States of Alabama, Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Idaho, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia and the District of Columbia, and by this Notice of Quarantine No. 38 do order that no plants of the following species, Berberis aethensis, B. altaica, B. amurensis, B. aristata, B. asiatica, B. atropurpurea, B. brachybotrys, B. brevipaniculata, B. buxifolia, B. canadensis, B. caroliniana (carolina), B. coriaria, B. cretica, B. declinatum, B. fendleri, B. fischeri, B. fremontii, B. Heteropoda, B. ilicifolia, B. integerrima, B. laciflora, B. lycium, B. macrophylla, B. neapalensis, B. neubertii, B. siberica, B. sieboldii, B. sinensis, B. trifoliolata, B. umbellata, B. vulgaris, including its subspecies and horticultural varieties, Mahonia aquifolium, M. diversifolia, M. glauca and M. repens, shall be moved or allowed to move interstate to points outside of the quarantined area.

This quarantine shall not apply to the movements by the United States Department of Agriculture of the products named for experimental or scientific purposes.

Done in the District of Columbia this 15th day of April, 1919.

Witness my hand and the seal of the United States Department of Agriculture.

D. F. HOUSTON,
Secretary of Agriculture.

EXTENSION OF JAPANESE BEETLE QUARANTINE

The necessity for an extension of the federal quarantine on account of the Japanese beetle in New Jersey and for placing greater restrictions on the movement of products leaving the quarantined district are set forth in the notice of hearing and in the news statement with respect to such extension of quarantine. These documents, together with the text of the quarantine and regulations subsequently issued, and a warning statement with respect to the movement of products under control, are reproduced below.

Notice of Public Hearing on the Proposed Extension of the Quarantine on Account of the Japanese Beetle in New Jersey

Washington, D. C., January 5, 1920.

The Secretary of Agriculture has information that a dangerous insect infestation, namely, the Japanese beetle (Popillia japonica Newm.), not heretofore widely prevalent or distributed within and throughout the United States, exists in the following townships and boroughs in the State of New Jersey, to wit: The townships of Delran, Chester, Cinnaminson, Palmyra, Mount Laurel, and Riverside, and the borough of Riverton in Burlington County, and the townships of Pensauken and Delaware, and the borough of Merchantville in Camden County.

It appears that the territory above described should be quarantined in accordance with Section 8 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), as amended by Act of Congress approved March 4, 1917 (39 Stat., 1134, 1165), and that the movement from said territory into other states, territories and districts of marketable perishable food crops of all kinds, including green corn, tomatoes, beans, peas, cantaloupes, watermelons, grapes, raspberries, blackberries, cherries, peaches, apples and all other fruits, vegetables, and fresh food products other than canned, dried, or preserved products; also of hay, forage and grain crops of all kinds, and of nursery and greenhouse products, including trees, shrubs, plants of all kinds, bulbs and flowers, should be restricted or prohibited.

Notice is therefore hereby given that a public hearing will be held at the Department of Agriculture, Washington, D. C., room 11, Federal Horticultural Board, at 10 o'clock a. m., January 27, 1920, in order that any person interested in the proposed quarantine may appear and be heard, either in person or by attorney.

The New Jersey State Department of Agriculture will cooperate in the enforcement of the proposed quarantine so far as the intrastate movement of nursery stock, greenhouse plants, bulbs, etc., is concerned.

The quarantine now in force on account of the Japanese beetle covers only the townships of Delran, Chester and Cinnaminson, county of Burlington, N. J., and restricts only the movement of green corn, commonly called sweet or sugar corn.

WOULD EXTEND JAPANESE BEETLE QUARANTINE

Federal Horticultural Board Announces Hearing on Proposal Affecting Townships in New Jersey

The Japanese beetle, a dangerous imported insect that has caused restrictions on the movement of green corn from Delran, Chester and Cinnaminson Townships, in Burlington County, N. J., is spreading, and it is proposed that the quarantine against the insect be extended. A public hearing on this proposal will be held at the Department of Agriculture, Washington, D. C., room 11, Federal Horticultural Board, at 10 a. m., January 27, 1920, in order that any person interested in the proposed quarantine may be heard either in person or by attorney.

According to the proposed action, the quarantine will be extended to include, in addition to the townships mentioned, Palmyra, Mount Laurel and Riverside Townships, and Riverton Borough in Burlington County, and Pensauken and Delaware Townships and Merchantville Borough in Camden County, N. J. It is also proposed to restrict or prohibit the interstate movement from the territory mentioned of all kinds of marketable, perishable food crops, "including green corn, tomatoes, beans, peas, cantaloupes, watermelons, grapes, raspberries, blackberries, cherries, peaches, apples, and all other fruits, vegetables, and fresh food products other than canned, dried or preserved products; also of hay, forage, and grain crops of all kinds, and of nursery and greenhouse products, including trees, shrubs, plants of all kinds, bulbs and flowers."

The notice of the hearing says that "The New Jersey State Department of Agriculture will cooperate in the enforcement of the proposed quarantine so far as the intrastate movement of nursery stock, greenhouse plants, bulbs, etc., is concerned."

QUARANTINE ON ACCOUNT OF JAPANESE BEETLE

Notice of Quarantine No. 40, With Regulations

(Effective on and after Apr. 1, 1920)

(Supersedes No. 35)

The fact has been determined by the Secretary of Agriculture, and notice is hereby given that an injurious insect, the Japanese beetle (Popilla japonica Newm.), not heretofore widely distributed within and throughout the United States, exists in a portion of the State of New Jersey.

Now, therefore, I, J. R. Riggs, Acting Secretary of Agriculture, under authority conferred by Section 8 of the Plant Quarantine Act approved August 20, 1912 (37 Stat., 315), as amended by the Act of Congress approved March 4, 1917 (39 Stat., 1134, 1165), do hereby quarantine the territory hereinafter described as infested by the Japanese beetle, and by this Notice of Quarantine No. 40 do order that (1) farm, garden, and orchard products of all kinds, including fresh or perishable crops, such as green corn, tomatoes, beans, peas, cantaloupes, watermelons, grapes, raspberries, blackberries, cherries, peaches, apples, and all other fresh fruit and vegetables; (2) grain and forage crops of all kinds; (3) nursery, ornamental and greenhouse stock, and all other plants, including bulbs and cut flowers; and (4) soil, compost and manure other than fresh manure, shall not be moved or allowed to be moved interstate from the said quarantined district in manner or method or under conditions other than those prescribed in the rules and regulations hereinafter made, and amendments thereto.

The following territory is designated as the area quarantined for the Japanese beetle: The townships of Delran, Chester, Cinnaminson, Palmyra, Mount Laurel, and Riverside, and the borough of Riverton, county of Burlington, and the townships of Pensauken and Delaware, and the borough of Merchantville, county of Camden, N. J.

REGULATIONS

Regulation 1.—Regulation of Movement of Articles Covered. (1) Farm, garden and orchard products of all kinds, including fresh or perishable crops, such as green corn, tomatoes, beans, peas, cantaloupes, watermelons, grapes, raspberries, blackberries, cherries, peaches, apples, and all other fresh fruits and vegetables; (2) grain and forage crops of all kinds; (3) nursery, ornamental, and greenhouse stock and all other plants, including bulbs and cut flowers; and (4) soil, compost and manure other than fresh manure, shall not be moved or allowed to be moved interstate to any point outside the territory quarantined for the Japanese beetle unless and until such articles have been inspected by the United States Department of Agriculture and certified to be free from the Japanese beetle; provided, that in the case of nursery, ornamental and greenhouse stock, and all other plants, including bulbs and cut flowers, this quarantine and regulation shall apply throughout the year; in the case of all other products, for the period between June 15 and November 1.

Regulation 2. Inspection, Certification and Marking a Condition of Interstate Transportation. Each car, vehicle, box, basket or other container of the articles enumerated in Regulation 1 shall be plainly marked with the name and address of the consignor and the name and address of the consignee, and shall bear a certificate showing that the contents have been inspected by the United States Department of Agriculture and found to be free from the Japanese beetle; provided, that in the case of such articles moved in carload or other bulk shipments the certificate of inspection shall accompany the waybills, conductor's manifests, memoranda or bills of lading, or in case of truck or other road vehicle, the certificate of inspection shall accompany the vehicle; provided further, that in case of individual farms or districts within the quarantined area on which the insect has not thus far been found, shipments from said farms or districts in bulk or small packages are authorized under a permit (valid until revoked) showing that said farms and districts have been inspected by the United States Department of Agriculture and found free from the Japanese beetle. Copies of such permit shall be attached to small packages, or in the case of bulk shipments, to waybills, conductor's manifests, memoranda or bills of lading pertaining thereto, and shall be accepted by transportation companies in lieu of certificates of inspection.

Regulation 3. Conditions Governing Inspection and Issuance of Permits.* Persons intending to move or allow to be moved interstate any of the articles enumerated in Regulation 1, for which certificates of inspection or permits are required by these regulations, will make application therefor as far as possible in advance of the probable date of shipment. Applicants for certificates will be required to assemble the articles at such points as the inspector of the Department of Agriculture shall designate, and so to place them that the inspection may readily be made. All charges for storage, cartage and labor incident to inspection other than the services of the inspectors shall be paid by the shipper.

Regulation 4. Thorough Cleaning Required of Trucks, Wagons, Boats and Other Vehicles Before Moving Interstate. Trucks, wagons, boats and other vehicles which have been used in transporting any article covered by this quarantine within the quarantined district, shall not be moved or allowed to be moved interstate unless the same shall have been thoroughly swept and cleaned before they are employed in interstate transportation.

This notice of quarantine amends and supersedes Notice of Quarantine No. 35, promulgated September 24, 1918, and shall be in force until further notice.

Done in the District of Columbia this 26th day of February, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal] J. R. RIGGS,
Acting Secretary of Agriculture.

* Requests for inspection or for permits should be addressed to the office of the Federal Horticultural Board, United States Department of Agriculture, Riverton, N. J.

U. S. Department of Agriculture (New Jersey Department of Agriculture Cooperating) Warning

Certain areas in New Jersey have been placed under quarantine by the Secretary of the United States Department of Agriculture because of the presence of the Green Japanese beetle.

The transportation, by any means, of farm, garden and orchard products of all kinds, including fruit, vegetables, hay and grain, from the infested areas, from June 15 to November 1, and of nursery, ornamental and greenhouse stock, and all other plants, including bulbs and cut flowers, throughout the year, is prohibited, unless such material has been inspected and certified by an inspector of the United States Department of Agriculture to be free from the Japanese beetle.

Inspection is made without expense to the owner or shipper.

Maps showing the areas where inspection is required have been furnished to the postmasters, express agents and the freight agents of the railroads operating in the infested territory.

Further information can be secured from the office of the Riverton Entomological Laboratory, Riverton, N. J. Telephone Riverton 207-m.

The penalty for violating the provisions of the Plant Quarantine Act is a fine not to exceed $500, or imprisonment not to exceed one year, or both, in the discretion of the court.

E. T. MEREDITH,
Secretary of Agriculture.

April 27, 1920.

ENTRY PROHIBITED OF STOCKS, CUTTINGS, SCIONS AND BUDS OF FRUITS FROM ASIA, JAPAN, PHILIPPINE ISLANDS AND OCEANIA

The reason for taking quarantine action prohibiting the importation for any purpose of stocks, cuttings, scions and buds of fruits from Asia, Japan, Philippine Islands and Oceania (including Australia and New Zealand) is explained in the news statement reproduced below, issued in connection with the notice of hearing. This statement, together with the notice of hearing and the text of the quarantine, is reproduced below.

Notice of Public Hearing to Consider the Advisability of Quarantining Asia, Japan, Philippine Islands and Oceania on Account of Dangerous Plant Diseases and Insect Pests

Washington, D. C., February 2, 1920.

The Secretary of Agriculture has information that dangerous plant diseases, including Japanese apple cankers (Valsa mali and Diaporthe mali), blister blight (Taphrina piri), and rusts (Gymnosporangium Koreaense and G. photiniae), and injurious insect pests, including the Oriental fruit moth (Laspeyresia molest), the pear fruit borer (Nephopteryx rubrizonella), the apple moth (Argyresthia conjugella), Psylla pyrisuga, Lecanium glandi and Lecanium kunoensis, new to and not heretofore widely prevalent or distributed within and throughout the United States, exist in Asia, Japan, Philippine Islands and Oceania, and that there is danger of introducing these and other plant diseases and insect pests with stocks, cuttings, scions and buds of fruits from the countries and localities named.

It appears, therefore, that the countries and localities above named should be quarantined in accordance with the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), and that the movement from said countries and localities to the United States of stocks, cuttings, scions and buds of fruits should be prohibited.

Notice is therefore hereby given that a public hearing will be held at the

Department of Agriculture, Washington, D. C., room 11, Federal Horticultural Board, at 10 o'clock a. m., March 9, 1920, in order that any person interested in the proposed quarantine may appear and be heard either in person or by attorney.

(Press Notice)

Quarantine May Be Placed Against Fruit Stocks from the Orient

In order to prevent the entrance of a number of plant diseases and injurious insects from the Orient, the United States Department of Agriculture proposes to prohibit the importation of fruit stocks, cuttings, scions and buds from Asia, Japan, the Philippine Islands and Oceania. The Secretary of Agriculture has called a hearing to be held in the offices of the Federal Horticultural Board in Washington at 10 o'clock, March 9, at which interested persons may be heard either in person or by attorney. The diseases and insects that the department seeks to exclude by the quarantine include Japanese apple cankers, blister blight and rusts, the oriental fruit moth, the pear fruit borer and the apple moth.

Stocks, Cuttings, Scions and Buds of Fruits Quarantine

(Effective on and after June 1, 1920)

Notice of Quarantine No. 44

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that dangerous plant diseases, including Japanese apple cankers, (Valsa mali and Diaporthe mali), blister blight (Taphrina piri), and rusts (Gymnosporangium Koreaense and G. photiniae), and injurious insect pests, including the Oriental fruit moth (Laspeyresia molesta), the pear fruit borer (Nephopteryx rubrizonella), the apple moth (Argyresthia conjugella), Psylla pyrisuga, Lecanium glandi and Lecanium kunoensis, new to and not heretofore widely prevalent or distributed within and throughout the United States, occur in Asia, Japan, Philippine Islands and Oceania (including Australia and New Zealand).

Now, therefore, I, E. T. Meredith, Secretary of Agriculture, under the authority conferred by the Act of Congress, approved August 20, 1912, known as the Plant Quarantine Act (37 Stat., 315), do hereby declare that it is necessary, in order to prevent the introduction into the United States of the dangerous plant diseases and insect pests mentioned above, to forbid the importation into the United States from Asia, Japan, Philippine Islands and Oceania (including Australia and New Zealand) of stocks, cuttings, scions and buds of fruits for propagation.

On and after June 1, 1920, and until further notice, by virtue of said Act of Congress approved August 20, 1912, the importation for any purpose of any variety of stocks, cuttings, scions and buds of fruits for or capable of propagation, from the above named countries and localities, is prohibited except for experimental or scientific purposes by the Department of Agriculture; provided, that special permits may be issued by the Secretary of Agriculture for limited quantities, and under safeguards to be prescribed in such permits, of stocks, cuttings, scions and buds of fruits from the countries and localities above named for the purpose of keeping the country supplied with new varieties and necessary propagating stock; provided further, that the entry for immediate export or for immediate transportation and exportation in bond of stocks, cuttings, scions and buds of fruits from the countries and localities above named may be permitted in accordance with the regulations governing such entry for immediate export, or for immediate transportation and exportation in bond, promulgated by the Secretary of Agriculture October 20, 1917.

Done in the District of Columbia this 24th day of March, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal]

E. T. MEREDITH,
Secretary of Agriculture.

(Press Notice)

Quarantine Placed Against Fruit Stocks from the Orient

April 2, 1920.

The Secretary of Agriculture has issued a quarantine effective June 1, prohibiting the importation of fruit stocks, cuttings, scions and buds from Asia, Japan, the Philippine Islands and Oceania. This quarantine was issued in response to a hearing held at the department in Washington, March 9, and is for the purpose of excluding from the United States diseases and insects which are known to infest such materials in various Oriental countries. These pests include cankers, blister blights and rusts, the Oriental fruit moth, the pear fruit borer and the apple moth.

This quarantine has very little commercial significance, as the importations involved are limited in quantity and of minor importance. Such imported fruit stocks and cuttings have hitherto come chiefly from France or other European countries, and only recently have some requests for permits for the importation of such stock from Japan been received.

Enough is known of the insects and diseases which attack such trees in the Orient to indicate the extreme undesirability of opening up general commercial importation of such articles. Furthermore, no adequate survey of these countries has been made, and the diseases which are not known probably outnumber those which are known. It will still be possible under quarantine No. 37, to which this action is an amendment, to import the articles prohibited through the agency of the Department of Agriculture and under full departmental disinfection and control to meet all legitimate needs for the introduction of any new varieties or strains of necessary stock which would otherwise not be available for horticulturists in this country.

STERILE PACKING MATERIAL FOR PACKING FOR BULBS AUTHORIZED

Amendment No. 1 to Quarantine No. 37 provides that the requirement as to freedom from sand, soil or earth shall not apply to sand, soil or earth used for packing the articles enumerated in item No. 1 of Regulation 3 when such sand, soil or earth has been previously sterilized in accordance with methods prescribed by the Federal Horticultural Board under the supervision of an authorized inspector of the country of origin, such sterilization to be certified to by the duly authorized inspector of such country of origin. With respect to this amendment, the board has authorized the use of certain materials as fulfilling the requirements of sterilization, such materials, however, to be subject to certification, as to compliance with the required conditions, by the duly authorized inspector of the country of origin. The following substitutes for sterilized soil have been authorized:

(1) Subsoil from Japan.—The authorization of the use of subsoil from Japan was based on the results of an investigation made by the Bureau of Plant Industry of this department, which indicated that unsterilized subsoil contains less organisms than loam or top soil, even after the latter has been submitted to the standard process of sterilization. The conditions of the use of such soil are indicated in the paragraphs quoted below, which were submitted for approval by Dr. S. I. Kuwana, director of the imperial plant quarantine station, Yokohama, Japan:

All soil used in packing bulbs to be shipped to the United States to be collected and handled under the supervision of the director of the imperial plant quarantine station at Yokohama, Japan.

The director of the imperial plant quarantine station will certify that the soil used in packing is subsoil taken from two to three feet below the surface; that

it has been sieved, dried and stored so as to prevent contamination by insects and diseases, and that no dangerous insects or diseases are known to occur in the locality where the soil is secured.

(2) Dune Sand from Holland.—On representations made by Mr. N. Van Poeteren, chief of the phytopathological service of Holland, the board has authorized the use, when properly certified, of dune sand taken from a depth of five feet or more from the surface.

(3) Coral Sand from Bermuda.—Similar arrangements have been made for the use of unsterilized coral sand uncontaminated with surface soil for use in packing bulbs shipped from the Bermuda Islands when properly certified by the director of agriculture of those islands.

(4) Ground Peat.—The use of ground peat for plant packing has been authorized by the board. Peat as commercially mined can be considered as substantially sterile with respect to infestation with plant diseases or other plant pests. For packing and greenhouse use it is dried, ground up and powdered, and in this condition can undoubtedly safely be used as packing for bulbs and its use in such condition for this purpose has been, therefore, authorized.

BAD CONDITION OF FRENCH FRUIT STOCKS

April 19, 1920.

This office has recently been advised of the bad condition of French fruit stocks both from the point of insect infestation and from the nature of the packing employed. This information comes particularly from Mr. C. P. Lounsbury with respect to such stocks imported into South Africa and from Mr. H. F. Dietz, the assistant entomologist of the State of Indiana and formerly connected with this department.

Mr. Lounsbury reports that the majority of an importation of 80,000 pear stocks landed at Capetown were infested with scale insects, including Aspidiotus pyri Licht., Epidiaspis betuloe Sign. and Pulvinaria betuloe (L.) Sign., and also wooly apis and lepidopterous larvae, and that some of the trees were affected by crown gall.

Mr. Dietz reports a very "dirty" condition of packing employed, which included leaves of various deciduous trees and of two-leaved pines more or less of which showed insect work and might easily carry insect pests, so much so that he has insisted on the burning of all such packing. Furthermore, a large percentage of the stock was worthless, i. e., dead, when received.

In view of these conditions it may be desirable to issue an order requiring the subjection of all such stock to vacuum fumigation in the future as well as to take steps to secure the use of cleaner packing material. It is now near the end of the importing season for this spring, but there will probably still be opportunity for you to examine such imported French stock coming into your State. The board would like to have a report from you on the condition of this material, the amount and nature of infestation which you may find, and the nature and condition of packing. It heartily recommends the burning of all packing material.

C. L. MARLATT,
Chairman of Board.

QUARANTINE ON ACCOUNT OF THE EUROPEAN CORN BORER AND OTHER DANGEROUS INSECTS AND PLANT DISEASES

Notice of Quarantine No. 41, with Regulations

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that dangerous plant pests, including the so-called European corn borer (Pyrausta nubilalis Hubn.), and also other dangerous insects, as well as plant diseases not heretofore widely prevalent or distributed within and throughout the United States, exist, as to one or more of such pests, in Europe, Asia, Africa, Dominion of Canada, Mexico, Central and South America, and other foreign coutries and localities, and may be introduced into this country through importations of the stalks or other parts of Indian corn or maize, broom corn and related plants.

Now, therefore, I, E. T. Meredith, Secretary of Agriculture, under the authority conferred by the Act of Congress approved August 20, 1912, known as the Plant Quarantine Act (37 Stat., 315), do hereby declare that it is necessary, in order to prevent the further introduction of the dangerous plant pests mentioned above, to forbid, except as provided in the rules and regulations supplemental hereto, the importation into the United States from all foreign countries and localities of the stalk and all other parts, whether used for packing or other purposes, in the raw or unmanufactured state, of Indian corn or maize (Zea Mays L.), broom corn (Andropogon sorghum var. technicus), sweet sorghums (Andropogon sorghum), grain sorghum (Andropogon sorghum), Sundan grass (Andropogon sorghum sudanensis), Johnson grass (Andropogon halepensis), sugar cane (Saccharum officinarum), including Japanese varieties, pearl millet (Pennisetum glaucum), napier grass (Pennisetum purpureum), teosinte (Euchalaena luxuriians), and Job's tears (Coix lachryma-Jobi).

Hereafter, and until further notice, by virtue of said Act of Congress approved August 20, 1912, the importation into the United States of the stalk and all other parts of the plants enumerated above from all foreign countries and localities, except as provided in the rules and regulations supplemental hereto, is prohibited.

Done in the District of Columbia this 21st day of February, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal] E. T. MEREDITH,
Secretary of Agriculture.

Rules and Regulations Supplemental to Notice of Quarantine No. 41, Governing the Importation of Indian Corn or Maize, Broom Corn and Related Plants

Regulation 1. Sorghum Hay, Grain and Seeds for Which Permit Is not Required. Sorghum hay from Canada, and clean shelled or threshed grain (from any country) of the plants covered in this quarantine, except as to such grain or seeds covered by special quarantine and other restrictive orders now in force, or such as may hereafter be made subject to special quarantines, may be imported without permit or other compliance with these regulations.*

Regulation 2. Broom Corn for Manufacturing Purposes Permitted Entry under Regulation. The importation of broom corn for manufacturing purposes may be permitted under the conditions hereinafter set forth in these regulations.

* The entry of the following plants and plant products is prohibited or restricted by specific quarantines and other restrictive orders now in force:

(a) Living canes of sugar cane, or cuttings or parts thereof, including seed from all foreign countries.

(b) Seed and all other portions in the raw or unmanufactured state of Indian corn or maize (Zea mays L.), and the closely related plants, including all species of Teosinte (Euchlaena), Job's tears (Coix), Polytoca, Chionachne and Sclerachne, from Southeastern Asia (including India, Siam, Indo-China and China), Malayan Archipelago, Australia, New Zealand, Oceania, Philippine Islands, Formosa, Japan and adjacent islands.

Regulation 3. Application for Permits for Importation of Broom Corn. Persons contemplating the importation of broom corn shall first make application to the Federal Horticultural Board for a permit, stating in the application the name and address of the exporter, the country and locality where grown, the port of entry, and the name and address of the importer in the United States to whom the permit should be sent.

Applications for permits should be made in advance of the proposed shipments; but if, through no fault of the importer, a shipment should arrive before a permit is received, the importation will be held in customs custody, at the risk and expense of the importer, for a period not exceeding 20 days pending the receipt of the permit.

Applications may be made by telegraph, in which case the information required above must be given.

Regulation 4. Issuance of Permits. On approval by the Secretary of Agriculture of an application for the importation of broom corn, a permit will be issued in quadruplicate. One copy will be furnished to the applicant for presentation to the customs officer at the port of entry, one copy will be mailed to the collector of customs, and one to the inspector of the Department of Agriculture at the port of entry, and the fourth will be filed with the application.

A separate permit will be required for each importation, and these permits will be issued for the ports of Boston, New York, San Francisco and Seattle, and such other ports as may from time to time be approved by the Federal Horticultural Board. The permit will be addressed to the collector of customs at the port for which it is issued.

Regulation 5. Disinfection a Condition of Entry. All importations of broom corn shall be subject, as a condition of entry, to such disinfection as shall be required by the inspector of the Department of Agriculture. Should such broom corn, however, prove to be so infested with plant diseases or insect pests that in the judgment of the inspector it can not be freed from such infestation by disinfection or other treatment, the entire shipment shall be refused entry.

When entry under disinfection is permitted, the broom corn will be delivered to the permittee for disinfection upon the filing with the collector of customs of a bond in the amount of $5,000, or in an amount equal to the invoice value, if such value be less than $5,000, with approved sureties, the condition of which shall be that the broom corn shall be disinfected under the supervision of an inspector of the Department of Agriculture; that no bale or other container thereof shall be broken, opened or removed from the port of entry unless and until a written notice is given to such collector by an inspector of the Department of Agriculture that the broom corn has been properly disinfected, and that the importation shall be redelivered to the collector of customs within 40 days after arrival at the port of entry.

Regulation 6. Notice of Arrival by Permittee. Immediately upon arrival of the broom corn at the port of entry the permittee shall submit in duplicate notice to the Secretary of Agriculture, through the collector of customs, on forms provided for that purpose, stating the number of the permit, date of entry, name of ship or vessel, the country and locality where grown, name of the foreign shipper, number of bales and marks and numbers on bales, the port of entry, and the name of the importer or broker at the port of entry.

Regulation 7. Importations by the United States Department of Agriculture Permitted. These regulations shall not apply to the importation by the United States Department of Agriculture of broom corn for experimental or scientific purposes.

The above rules and regulations are hereby adopted, and shall be in force until further notice.

E. T. MEREDITH,
Secretary of Agriculture.

February 21, 1920.

QUARANTINE ON ACCOUNT OF EUROPEAN CORN BORER

Notice of Quarantine No. 43

(Effective on and after March 29, 1920. Supersedes Quarantine No. 36)

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that an injurious insect, the European corn borer (Pyrausta nubilalis Hubn.) new to and not heretofore widely prevalent or distributed within and throughout the United States, exists in the States of Massachusetts, New Hampshire, New York and Pennsylvania.

Now, therefore, I, E. T. Meredith, Secretary of Agriculture, under authority conferred by Section 8 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), as amended by the Act of Congress approved March 4, 1917 (39 Stat., 1134, 1165), do hereby quarantine the States of Massachusetts, New Hampshire, New York and Pennsylvania, and by this notice of quarantine No. 43 do order that corn and broom corn, including all parts of the stalk, celery, green beans in the pod, beets with tops, spinach, rhubarb, oat and rye straw as such or when used as packing cut flowers or entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia, except the bulbs thereof, without stems, shall not be moved or allowed to be moved interstate from any areas in said quarantined states designated in the regulations supplemental hereto as infested with corn borer in manner or method or under conditions other than those prescribed in the rules and regulations hereinafter made and amendments thereto.

Done in the District of Columbia this 15th day of March, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal] E. T. MEREDITH,
Secretary of Agriculture.

Rules and Regulations Supplemental to Notice of Quarantine No. 43

Regulation 1. Definitions. For the purposes of these regulations the following words, names and terms shall be construed, respectively, to mean:

(a) Corn borer: The insect known as the European corn borer (Pyrausta nubilalis Hubn.).

(b) Quarantined area: Any state, or any portion thereof, quarantined by the Secretary of Agriculture upon determination by him that the corn borer exists therein.

(c) Infested area: Those portions of any quarantined area which are determined by the Secretary of Agriculture to be infested with the corn borer.

(d) Inspector: An inspector of the United States Department of Agriculture.

Regulation 2. Plants and Plant Products Subject to Restriction. The restrictions on the movement of plants and plant products covered in this Notice of Quarantine No. 43 and in the rules and regulations supplemental thereto shall apply to all products enumerated in the notice of quarantine originating in or moving from the areas in the quarantined states now or hereafter designated by the Secretary of Agriculture as infested areas.

No restrictions are placed by this quarantine and the regulations supplemental thereto on the interstate movement of the articles enumerated therein from all points in the quarantined states outside of the areas now or hereafter designated by the Secretary of Agriculture as infested areas.

No restrictions are placed by this quarantine and the regulations supplemental thereto on the interstate movement of the articles enumerated in this notice of quarantine when they shall have been manufactured or processed in such manner as to eliminate risk of carriage of the corn borer, nor of clean shelled corn, and clean seed of broom corn.

Regulation 3. Infested Areas. The fact has been determined by the Secretary of Agriculture that the corn borer exists in the areas designated below in the States of Massachusetts, New Hampshire, New York and Pennsylvania, and such cities and towns (or townships) in each state are designated an infested area for the purpose of these regulations:

Massachusetts: Barnstable, Bourne, Brewster, Dennis, Eastham, Falmouth, Harwich, Orleans, Provincetown, Sandwich, Truro, Wellfleet and Yarmouth, in Barnstable County; Amesbury, Andover, Beverly, Boxford, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Saugus, Swampscott, Topsfield, Wenham and West Newbury, in Essex County; Arlington, Bedford, Belmont, Burlington, Cambridge, Carlisle, Chelmsford, Concord, Dracut, Everett, Framingham, Lexington, Lincoln, Lowell, Malden, Medford, Melrose, Natick, Newton, North Reading, Reading, Somerville, Stoneham, Sudbury, Tewksbury, Tyngsboro, Wakefield, Waltham, Watertown, Weston, Wilmington, Winchester and Woburn, in Middlesex County; Avon, Braintree, Brookline, Cohasset, Holbrook, Milton, Quincy, Randolph, Wellesley and Weymouth, in Norfolk County; Abington, Brockton, Duxbury, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Middleboro, Norwell, Plymouth, Pembroke, Rockland and Scituate, in Plymouth County; Boston, Chelsea, Revere and Winthrop, in Suffolk County.

New Hampshire: Kingston, Plaistow and Seabrook, in Rockingham County.

New York (Eastern): Albany, Cohoes, Colonie and Guilderland, in Albany County; Johnstown and Perth, in Fulton County; Amsterdam, Florida and Mohawk, in Montgomery County; Brunswick, North Greenbush and Troy, in Rensselaer County; Ballston, Charlton, Clifton Park, Galway, Malta, Milton, Saratoga Springs and Stillwater, in Saratoga County; Glenville, Niskayuna, Princetown, Rotterdam and Schenectady, in Schenectady County; Esperance in Schoharie County; New York (Western): Dayton, Perrysburg and Persia, in Cattaraugus County; Hanover, Pomfret and Sheridan, in Chautauqua County; Brant, Collins, Cheektowaga, Eden, Evans, Hamburg and North Collins in Erie County.

Pennsylvania: North Girard, in Erie County.

The infested areas may be extended or reduced, as found necessary by the Secretary of Agriculture. Due notice of any extension or reduction and the areas affected thereby will be given in writing to the transportation companies doing business in or through the State in which the infested area is located and by publication in newspapers selected by the Secretary of Agriculture within the State in which the areas affected are located.

Regulation 4. Inspection and Certification a Condition of Movement from Infested Areas. Corn and broom corn, including all parts of the stalk, celery, green beans in the pod, beets with tops, spinach, rhubarb, oat and rye straw as such or when used as packing, cut flowers or entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock and cut flowers or entire plants of gladiolus and dahlia, except of bulbs thereof, without stems, shall not be moved or allowed to move interstate to any point outside the infested area quarantined for the corn borer unless and until such plants and plant products have been inspected by the United States Department of Agriculture and certified to be free from the corn borer. In the case of any of the articles enumerated in this regulation where absolute freedom from infestation can not be determined by the inspector of the Department of Agriculture, certification will be refused.

Regulation 5. Marking and Certification a Condition of Interstate Transportation. Every car, box, bale or other container of plants and plant products of which inspection is required by these regulations shall be plainly marked with the name and address of the consignor and the name and address of the consignee and shall

bear a certificate showing that the contents have been inspected by the United States Department of Agriculture and found to be free from corn borer infestation.

The inspection certificates in the case of carload and other bulk shipments shall accompany the way bills, conductors' manifests, memoranda, or bills of lading pertaining to such shipments.

Certificates of inspection will issue only for plants and plant products which have been actually inspected by the United States Department of Agriculture; provided, that when in the case of individual premises or districts within an infested area in any of the quarantined States it shall be determined by competent inspection that the corn borer does not infest any of the cultivated products grown in such premises or districts and that said premises or districts have been maintained in such condition of freedom from weeds or vegetable growths other than the cultivated products designated as to prevent possibility of occurrence of the corn borer through such agencies, a permit may be issued (valid until revoked) by the inspector of the Department of Agriculture stating that such premises or districts have been inspected and found free from the corn borer and free from weeds or other extraneous vegetation capable of harboring the corn borer, and authorizing the shipment from said premises or districts of any of the articles subject to this quarantine grown therein. Copies of such permits shall be attached to small packages, or in the case of bulk shipments, to way bills, conductors' manifests, memoranda, or bills of lading pertaining thereto, and may be accepted by transportation companies in lieu of certificates of inspection.

Regulation 6. Conditions Under Which Plants and Plant Products Originating Outside the Infested Areas May Be Shipped from Points Within the Infested Areas. Plants and plant products of which the interstate movement is restricted by these regulations which originate outside of the infested area quarantined for the corn borer may be shipped interstate from points within the infested areas to points outside such areas under permit from the Secretary of Agriculture. Permits will issue only for plants and plant products which are not infested with the corn borer and transportation companies shall not accept or move interstate from within the infested areas such plants and plant products originating outside the infested areas unless each shipment is accompanied by a permit issued by the United States Department of Agriculture.

Regulation 7. Conditions Governing Inspection and Issuance of Certificates. Persons intending to move or allow to be moved interstate plants and plant products for which certificates of inspection are required by these regulations will make application therefor as far as possible in advance of the probable date of shipment. Applications should show the nature and quantity of the plants or plant products which it is proposed to move together with their exact location and, if practicable, the contemplated date of shipment. Applicants for inspection will be required to assemble the articles to be inspected and so to place them that they can be readily examined. If not so placed, inspection may be refused. All charges for storage, cartage and labor incident to inspection other than the services of inspectors shall be paid by the shipper.

Regulation 8. Thorough Cleaning Required of Cars, Boats and Other Vehicles Before Moving Interstate. Cars, boats and other vehicles which have been used in transporting within the infested areas plant products covered by these regulations or any other articles which may hereafter be made subject thereto shall not be moved or allowed to move interstate unless the same shall have been thoroughly swept out and cleaned by the carrier at the point of unloading or destination of all litter and rubbish from such regulated articles. No litter, rubbish or refuse from any such plants and plant products shall be moved or allowed to move interstate.

Regulation 9. Shipments by United States Department of Agriculture. This quarantine shall not apply to the movement by the United States Department of Agriculture of the products named for experimental or scientific purposes.

This notice of quarantine amends and supersedes notice of quarantine No. 36, promulgated September 25, 1918, and shall be in force until further notice.

Done in the District of Columbia this 15th day of March, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal] E. T. MEREDITH,
Secretary of Agriculture.

Penalties. The plant quarantine act of August 20, 1912 (37 Stat., 315), provides that any person who shall violate any of the provisions of this act, or who shall forge, counterfeit, alter, deface or destroy any certificate provided for in this act or in the regulations of the Secretary of Agriculture, shall be deemed guilty of a misdemeanor and shall, upon conviction thereof, be punished by a fine not exceeding $500 or by imprisonment not exceeding one year, or both such fine and imprisonment, in the discretion of the court.

U. S. DEPARTMENT OF AGRICULTURE—OFFICE OF THE SECRETARY

Federal Horticultural Board

QUARANTINE ON ACCOUNT OF GIPSY MOTH AND BROWN-TAIL MOTH

NOTICE OF QUARANTINE NO. 33, WITH REGULATIONS (REVISED)

(Effective on and after July 1, 1919)

GIPSY MOTH AND BROWN-TAIL MOTH

The fact has been determined by the Secretary of Agriculture, and notice is hereby given, that two injurious insects—the gipsy moth (Porthetria dispar) and the brown-tail moth (Euproctis chrysorrhoea)—new to and not heretofore widely distributed within and throughout the United States, exist in parts of the following states, to wit: Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut.

Now therefore, I, D. F. Houston, Secretary of Agriculture, under the authority conferred by Section 8 of the plant quarantine act approved August 20, 1912 (37 Stat., 315), as amended by the act of Congress approved March 4, 1917 (39 Stat., 1134, 1165), do hereby quarantine the towns and territory hereinafter described as infested by the brown-tail moth, and the towns and territory hereinafter described as infested by the gipsy moth, and by this notice of quarantine No. 33, revised, do order that (1) coniferous trees, such as spruce, fir, hemlock, pine, juniper (cedar), and arbor-vitae (white cedar), known and described as "Christmas trees," and parts thereof, and decorative plants, such as holly and laurel, known and described as "Christmas greens or greenery"; (2) forest-plant products, including logs, tanbark, posts, poles, railroad ties, cordwood and lumber; (3) field-grown florists' stock, trees, shrubs, vines, cuttings, and other plants and plant products for planting or propagation, excepting fruit pits, seeds of fruit and ornamental trees and shrubs, field, vegetable and flower seeds, bedding plants, and other herbaceous plants and roots; and (4) stone or quarry products, shall not be moved or allowed to move interstate in manner or method or under conditions other than those prescribed in the rules and regulations hereinafter made and amendments thereto.

The following towns and all the territory between said towns and the Atlantic Ocean are quarantined for the brown-tail moth, namely: Houlton, Ludlow, New Limerick, Oakfield, Dyer Brook, Crystal, Patton, Staceyville, II Range

7, I Range 7, Millinocket, Indian Township, A West Seboeis, III (immediate south of A West Seboeis), Lakeview, Milo, Sebec, Foxcraft, Dover, Dexter, Cambridge, Harmony, Hartland, Cornville, Madison, Anson, New Vineyard, Farmington, Wilton, Dixfield, Mexico, Rumford, Andover, West Surplus, Grafton, Riley, Gilead, and Batchelders Grant, Maine; Chatham, Jackson, Bartlett, Albany, Waterville, Sandwich, Campton, Rumney, Dorchester, Canaan, Enfield, Granthan, Croydon, Newport, Goshen, Lempster Washington, Stoddard, Sullivan, Keene, Marlboro, Troy, and Richmond, New Hampshire; Northfield, Warwick, Orange, Athol, Petersham, Barre, Hardwick, New Braintree, West Brookfield, and Sturbridge, Massachusetts; Union, Eastford, Chaplin, Scotland, Canterbury, Lisbon, Griswold, North Stonington, Ledyard, and Groton, Connecticut.

The following towns and all the territory between said towns and the Atlantic Ocean are quarantined for the gipsy moth, namely: Tremont, Southwest Harbor, Mount Desert, Eden, Lamoine, city of Ellsworth, Dedham, Bucksport, Orrington, Hampden, city of Bangor, Hermon, Levant, Kenduskeag, Cornith, Exeter, Corrina, St. Albans, Harmony, Hartland, Cornville, Madison, Anson, New Vineyard, Farmington, Wilton, Dixfield, Mexico, Rumford, Andover, Andover West Surplus, Grafton, Riley, Gilead, and Batchelders Grant, Maine; Chatham, Jackson, Bartlett, Albany, Waterville, Sandwich, Campton, Rumney, Dorchester, Canaan, Enfield, Grantham, Croydon, Newport, Goshen, Lempster, Washington, Stoddard, Sullivan, Keene, Marlboro, Troy, and Richmond, New Hampshire; Northfield, Warwick, Orange, Athol, Petersham, Barre, Hardwick, New Braintree, West Brookfield, Brookfield, and Sturbridge, Massachusetts; Union, Eastford, Chaplin, Scotland, Canterbury, Lisbon, Griswold, North Stonington, and Ledyard, Connecticut; and Westerly, Rhode Island.

For the purpose of inspection, the above-designated towns and territory quarantined for the gipsy moth are divided into two areas to be known as the lightly infested area and the general infested area.

The following towns comprise the lightly infested area: Isle Au Haut, Swans Island, Tremont, Southwest Harbor, Mount Desert, Eden, Lamoine, Trenton, city of Ellsworth, Surry, Bluehill, Brooklin, Sedgwick, Deer Isle, Stonington, North Haven, Vinal Haven, Isleboro, Castine, Brooksville, Penobscot, Orland, Dedham, Orrington, Bucksport, Stockton Springs, Searsport, Prospect, Frankfort, Winterport, Hampden, Hermon, city of Bangor, Kenduskeag, Cornith, Levant, Carmel, Newburgh, Monroe, Brooks, Swanville, Waldo, city of Belfast, Northport, Lincolnville, Camden, Hope, Appleton Searsmont, Belmont, Morrill, Montville, Knox, Thorndike, Jackson, Dixmont, Etna Stetson, Exter, Corrina, Newport, Plymouth, Troy, St. Albans, Palmyra, Detroit, Burnham, Unity, Freedom, Liberty, Washington, Somerville, Palmero, Albion, Benton, Clinton, Canaan, Pittsfield, Hartland, Harmony, Corville, Skowhegan, China, Winsdor, Vassalboro, Winslow, Waterville, Madison, Norridgewock, Smithfield, Fairfield, Oakland, Sidney, Anson, Stark, Mercer, Rome, Belgrade, Manchester, Winthrop, Readfield, Mount Vernon, Vienna, New Sharon, Industry, New Vineyard, Farmington, Chesterville, Fayette, Wayne, Monmouth, Wilton, Jay, Livermore East Livermore, Leeds, Greene, Dixfield, Canton, Hartford, Turner, Mexico, Peru, Sumner, Buckfield, Hebron, Oxford, Otisfield, Harrison, Waterford, Norway, Paris, Woodstock, Greenwood, Albany, Bethel, Milton, Franklin, Rumford, Andover, Andover West Surplus, Newry, Grafton, Riley, Gilead, Fryburg, Academy Grant, Mason, Stoneham, Lovell, Sweden, Fryeburg, Stow, and Batchelders Grant, Maine; Chatham, Jackson, Bartlett, Conway, Eaton, Madison, Tamworth, Albany, Waterville, Sandwich, Campton, Rumney, Plymouth, Bridgewater, Hebron, Groton, Dorchester, Canaan, Orange, Alexandria, Danbury, Grafton, Enfield, Grantham, Springfield, Wilmot, New London, Sunapee, Croydon, Newport, Goshen, Newbury, Bradford, Washington, Lempster, Hillsborough, Windsor, Stoddard, Antrim, Hancock, Nelson, Sullivan, Keene, Roxbury, Harrisville, Dublin, Marlboro, Troy, Jaffrey, Fitzwilliam, and Richmond, New Hampshire; Northfield, Warwick, Royal-

ston, Orange, Athol, Phillipston, Templeton, Hubbardston, Petersham, Barre, Harwick, New Braintree, Oakham, Rutland, Paxton, Leicester, Spencer, North Brookfield, West Brookfield, Brookfield, Sturbridge, Charlton, Southbridge, and Dudley, Massachusetts; Union, Woodstock, Eastford, Pomfret, Brooklyn, Hampton, Chaplin, Scotland, Canterbury, Lisbon, Griswold, Voluntown, Ledyard, and North Stonington, Connecticut; Hopkinton, Westerly, Richmond, Charlestown, South Kingstown, Narragansett, and New Shoreham, Rhode Island.

Other towns shall be classed as the generally infested area.

REGULATIONS

Regulation 1. Regulation of Movement of Plants and Plant Products and Stone or Quarry Products under Quarantine Originating in the Gipsy Moth Territory. (1) Coniferous trees, such as spruce, fir, hemlock, pine, juniper (cedar), and arbor-vitae (white cedar), known and described as "Christmas trees," and parts thereof, and decorative plants, such as holly and laurel, known and described as "Christmas greens or greenery"; (2) forest-plant products, including logs, tanbark, posts, poles, railroad ties, cordwood, and lumber; (3) field-grown florists' stock, trees, shrubs, vines, cuttings, and other plants and plant products for planting or propagation, excepting fruit pits, seeds of fruit and ornamental trees and shrubs, field, vegetable and flower seeds, bedding plants, and other herbaceous plants and roots; and (4) stone or quarry products, shall not be moved or allowed to move interstate to any point outside the towns and territory quarantined for the gipsy moth or from points in the generally infested area to points in the lightly infested area, unless and until such plants and plant products and stone or quarry products have been inspected by the United States Department of Agriculture and certified to be free from the gipsy moth and the brown-tail moth; but such plants and plant products and stone or quarry products may be moved interstate without restrictions, other than the requirements made by regulation 6 hereof, and such restrictions as may be imposed by State officials between all points within the lightly infested area, between points in said area and points in the generally infested area, and between all points within the generally infested area.

Regulation 2. Regulation of Movement of Plants and Plant Products Under Quarantine Originating in the Brown-Tail Moth Territory.* Deciduous trees and shrubs or such parts thereof as bear leaves, including all deciduous field-grown florists' stock, vines, cuttings, grafts, and scions, but excepting forest-plant products, such as logs, tanbark, posts, poles, railroad ties, cordwood and lumber, shall not be moved or allowed to move interstate to points outside the towns and territory quarantined for the brown-tail moth, unless and until such plants and plant product have been inspected by the United States Department of Agriculture and certified to be free from the brown-tail moth.

The interstate movement of all classes of plants and plant products entirely within the towns and territory quarantined for the brown-tail moth only will be permitted without restriction, other than the requirements made by regulation 6 hereof, and such restrictions as may be imposed by State officials.

Regulation 3. Inspection, Certification, and Marking a Condition of Interstate Transportation. Every car, box, bale, or other container of plants and plant products and stone or quarry products of which inspection is required by these regulations, shall be plainly marked with the name and address of the consignor

*This regulation applies only to the quarantined territory for the brown-tail moth lying beyond or outside of the territory quarantined for the gipsy moth, because all shipments from territory common to the gipsy moth and the brown-tail moth are governed by the conditions of regulation 1. Coniferous trees and other evergreen trees are not covered by the brown-tail moth regulations.

and the name and address of the consignee, and shall bear a certificate showing that the contents have been inspected by the United States Department of Agriculture and found to be free from moth infestation.

The inspection certificates in the case of carload and other bulk shipments shall accompany the way bills, conductors' manifests, memoranda, or bills of lading pertaining to such shipments.

Certificates of inspection will issue only for plants and plant products and stone or quarry products which have been actually inspected by the United States Department of Agriculture, and the use of such certificates in connection with plants and plant products and stone or quarry products which have not been so inspected is prohibited.

Regulation 4. Conditions Under Which Plants and Plant Products and Stone or Quarry Products Originating Outside of the Quarantined Territory May Be Shipped from Points Within the Quarantined Territory. Plants and plant products and stone or quarry products of which the interstate movement is restricted by these regulations and which originate outside the towns and territory quarantined for the gipsy moth or the brown-tail moth, may be shipped interstate from points within the quarantined towns and territory to points outside the quarantined towns and territory under permit from the Secretary of Agriculture. Permits will issue only for plants and plant products and stone or quarry products which are not infested with the gipsy moth or brown-tail moth, and transportation companies shall not accept or move interstate from within the quarantined towns and territory such plants and plant products and stone or quarry products originating outside the quarantined towns and territory unless each shipment is accompanied by a permit issued by the United States Department of Agriculture, 6 Beacon Street, Boston, Mass.

Regulation 5. Conditions Governing Inspection and Issuance of Permits.— Persons intending to move or allow to be moved interstate plants and plant products and stone or quarry products for which certificates of inspection or permits are required by these regulations, will make application therefor as far as possible in advance of the probable date of shipment. Applications should show the nature and quantity of the plants or plant products and stone or quarry products it is proposed to move, together with their exact location and, if practicable, the contemplated date of shipment. Applicants for inspection will be required to assemble the articles to be inspected at the shipping point, and to so place them that they can be readily examined. If not so placed, inspection will be refused. Articles to be inspected must be free from ice and snow and in condition to make inspection easily practicable. All charges for storage, cartage and labor incident to inspection other than the services of the inspectors, shall be paid by the shipper.

Regulation 6. Thorough Cleaning Required of Cars, Boats and Other Vehicles Before Moving Interstate. Cars, boats and other vehicles which have been used in transporting within the quarantined area under the provisions of regulations 1 and 2, which provide for such movement without inspection and certification, plants and plant products and stone or quarry products covered by these regulations, or any other article which may hereafter be made subject thereto, shall not be moved or allowed to move interstate unless the same shall have been thoroughly swept out and cleaned by the carrier at the point of unloading or destination of all litter and rubbish from such regulated articles. No litter, rubbish or refuse from any such plants and plant products and stone or quarry products or other article shall be moved or allowed to move interstate.

This notice of quarantine amends and supersedes Notice of Quarantine No. 33, promulgated May 20, 1918, and shall be effective until otherwise ordered.

Done in the District of Columbia this 19th day of May, 1919.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal]

D. F. HOUSTON,
Secretary of Agriculture.

U. S. DEPARTMENT OF AGRICULTURE

FEDERAL HORTICULTURAL BOARD

C. L. Marlatt, Chairman; W. A. Orton, Geo. B. Sudworth, W. D. Hunter, Karl F. Kellerman; R. C. Althouse, Assistant to the Chairman

RULES AND REGULATIONS GOVERNING (1) ENTRY FOR IMMEDIATE EXPORT, (2) ENTRY FOR IMMEDIATE TRANSPORTATION AND EXPORTATION IN BOND, AND (3) SAFEGUARDING THE ARRIVAL AT A PORT WHERE ENTRY OR LANDING IS NOT INTENDED OF PROHIBITED PLANTS AND PLANT PRODUCTS.

(Effective on and after August 1, 1920)

LETTER OF TRANSMITTAL

United States Department of Agriculture,
Federal Horticulture Board,
Washington, D. C., July 1, 1920.

Hon. E. T. Meredith,
Secretary of Agriculture.

Sir: The Federal Horticultural Board respectfully submits herewith rules and regulations governing (1) entry for immediate export, (2) entry for immediate transportation and exportation in bond, and (3) safeguarding the arrival at a port where entry or landing is not intended of prohibited plants and plant products.

These rules and regulations are a revision of and supersede the rules and regulations governing the entry for immediate export of prohibited plants and plant products promulgated October 20, 1917, effective December 1, 1917.

The purpose of Section 7 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), is to provide authority under which insects and diseases injurious to plants may be excluded from the United States. This section provides that "no person shall import or offer for entry into the United States" any class of plants or plant products the importation of which has been prohibited by the Secretary of Agriculture, "regardless of the use for which the same is intended." In view of the expressed purpose of this section, as well as the language employed, it is evident that the unloading or landing at any port of the United States for transshipment and immediate export of prohibited plants or plant products constitutes an importation within the meaning and intent of this section, and renders subject to prosecution any person so doing. Furthermore, the bringing of prohibited plants or plant products to a port of the United States or into the territorial waters of the United States, whether the same are offered for entry or not, constitutes a violation of the act, even if no actual unloading or landing is made.

The purpose of these regulations is to modify the quarantine orders as to plants and plant products now excluded, or which may hereafter be excluded by quarantine, so as to make provision, where such action can be taken without risk to the plant cultures of this country, for the entry of such plants or plant products either for immediate export or for immediate transportation and exportation in bond to meet the occasional exigencies of commerce. The purpose is to provide for such entry and transshipment only at such ports and under such conditions of unloading and transfer of cargoes or transportation in bond as shall conserve the interests of the United States. Furthermore, regulations 9 and 10 provide for the safeguarding of prohibited or restricted plants arriving at a port or within the territorial waters of the United States where entry or landing is not intended.

Respectfully,

FEDERAL HORTICULTURAL BOARD,
C. L. MARLATT, Chairman.

Approved:
R. W. WILLIAMS, Solicitor.

Rules and Regulations Governing (1) Entry for Immediate Export, (2) Entry for Immediate Transportation and Exportation in Bond, and (3) Safeguarding the Arrival at a Port Where Entry or Landing Is Not Intended of Prohibited Plants and Plant Products.

Under authority conferred on the Secretary of Agriculture by Section 9 of the Plant Quarantine Act of August 20, 1912 (37 Stat., 315), and in order to meet the occasional exigencies of commerce, it is ordered that the quarantines now in force prohibiting the entry from foreign countries into the United States of certain plants and plant products be, and the same are hereby, modified to permit the entry of such plants and plant products, either for immediate export or for immediate transportation and exportation in bond, under such restrictions as shall conserve the interests of the United States.

Entry for immediate export and for immediate transportation and exportation in bond of such plants and plant products may be made in accordance with the rules and regulations herewith promulgated.

Provision is also made in these regulations for the safeguarding of such prohibited or restricted plants or plant products arriving at a port or within the territorial waters of the United States even though no entry or landing of such plants or plant products is intended.

Plants and Plant Products Now Under Quarantine and Subject to These Regulations.* (a) Irish potatoes from Newfoundland; the islands of St. Pierre and Miquelon; Great Britain, including England, Scotland, Wales and Ireland; Germany; and Austria-Hungary; on account of the disease known as potato wart. There are, however, no federal restrictions on the importation of potatoes into the Territories of Hawaii and Porto Rico. (Quarantine No. 3.)

(b) Mexican fruits: Oranges, sweet limes, grapefruit, mangoes, achras, sapotes, peaches, guavas and plums from the Republic of Mexico, on account of the Mexican fruit fly. (Quarantine No. 5, as amended.)

(c) Five-leafed pines and all species and varieties of currant and gooseberry plants (Ribes and Grossularia), from each and every country of Europe and Asia, and from the Dominion of Canada and from Newfoundland, on account of the white-pine blister rust. (Quarantine No. 7, as amended.)

(d) Pines from all European countries and localities not already excluded under the white-pine blister-rust quarantine, on account of the European pine-shoot moth (Evetria buoliana). (Quarantine No. 20.)

(e) Cotton seed (including seed cotton) and cottonseed hulls from any foreign locality and country, excepting only the locality of the Imperial Valley, in the State of Lower California, Mexico, on account of the pink bollworm. (Quarantine No. 8, as amended.)

(f) Seeds of avocado or alligator pear from Mexico and the countries of Central America, on account of the avocado weevil. (Quarantine No. 12.)

(g) Sugar cane from all foreign countries, on account of certain injurious insects and fungous diseases affecting the sugar cane in such countries. There are, however, no federal restrictions on the importation into the Territories of Hawaii and Porto Rico of sugar cane. (Quarantine No. 15.)

(h) Citrus nursery stock from all foreign localities and countries, on account of the citrus canker and other dangerous citrus diseases. The term "citrus" as used in this quarantine includes all plants belonging to the subfamily or tribe Citratae. (Quarantine No. 19.)

(i) Seed and all other portions of Indian corn or maize (Zea mays L.), and the closely related plants, including all species of Teosinte (Euchlaena), Job's tears (Coix), Polytoca, Chionachne and Sclerachne, in the raw or unmanufactured state, from Southeastern Asia (including India, Siam, Indo-China and China),

* Information as to additions to or changes in this list of plants and plant products may be obtained on inquiry of the collectors of customs or the inspectors of the Federal Horticultural Board, or directly from the Secretary of Agriculture.

Malayan Archipelago, Australia, New Zealand, Oceania, Philippine Islands, Formosa, Japan, and adjacent islands, on account of the downy mildews and Physoderma diseases of Indian corn; except that Indian corn or maize may be imported under permit and on compliance with the regulations governing entry from the regions above named. (Quarantine No. 24, as amended.)

(j) All species and varieties of citrus fruits from Eastern and Southeastern Asia (including India, Siam, Indo-China and China), the Malayan Archipelago, the Philippine Islands, Oceania (except Australia, Tasmania and New Zealand), Japan (including Formosa and other islands adjacent to Japan), and the Union of South Africa, on account of citrus canker; except that oranges of the mandarin class (including satsuma and tangerine varieties) may be imported under permit and on compliance with the regulations governing entry from the regions named above. (Quarantine No. 28.)

(k) All varieties of sweet potatoes and yams (Ipomoea batatas and Dioscorea spp.) from all foreign countries and localities, on account of sweet potato weevils and the sweet potato scarabee. (Quarantine No. 29.)

(l) All species and varieties of banana plants (Muss. spp.) or portions thereof, from all foreign countries and localities, on account of the banana root borer. (Quarantine No. 31.)

(m) Bamboo seed, plants or cuttings thereof capable of propagation, including all genera and species of the tribe Bambuseae, from all foreign countries and localities, on account of dangerous plant diseases, including the bamboo smut. (Quarantine No. 34.)

(n) Nursery stock, plants and seeds from all foreign countries and localities, on account of certain injurious insects and fungous diseases, except as provided in the regulations supplemental thereto. Under these regulations the following plants and plant products may be imported without restriction: Fruits, vegetables, cereals and other plant products imported for medicinal, food or manufacturing purposes, and field, vegetable and flower seeds not covered by specific quarantine. (Quarantine No. 37.)

(o) Seed or paddy rice and all species and varieties of wheat, oats, barley and rye in the raw or uncleaned or unprocessed state, from Australia, India, Japan, Italy, France, Germany, Belgium, Great Britain, Ireland and Brazil, on account of flag smut and take-all diseases; except that wheat, oats, barley and rye may be imported under permit and upon compliance with the conditions prescribed in the regulations of the Secretary of Agriculture. (Quarantine No. 39.)

(p) The stalk and all other parts, whether used for packing or other purposes, in the raw or unmanufactured state, of Indian corn or maize (Zea Mays L.) broom corn (Andropogon sorghum var. technicus), sweet sorghums (Andropogon sorghum), grain sorghums (Andropogon sorghum), Sudan grass (Andropogon sorghum sudanensis), Johnson grass (Andropogon halepensis), sugar cane (Saccharum officinarum), including Japanese varieties, pearl millet (Pennisetum glaucum), napier grass (Pennisetum purpureum), teosinte (Euchlaena luxurians) and Job's tears (Coix lachryma-Jobi), from all foreign countries and localities, on account of the so-called European corn borer (Pyrausta nubilalis), except that broom corn for manufacturing purposes may be imported under permit and upon compliance with the conditions prescribed in the regulations of the Secretary of Agriculture. (Quarantine No. 41.)

(q) Indian corn or maize (Zea Mays L.) from Mexico, on account of the pink bollworm of cotton, except that such Indian corn or maize may be imported under permit and upon compliance with the conditions prescribed in the regulations of the Secretary of Agriculture. (Quarantine No. 42.)

(r) Stocks, cuttings, scions and buds of fruits for propagation from Asia, Japan, Philippine Islands and Oceania (including Australia and New Zealand), on account of dangerous plant diseases, including Japanese apple cankers, blister blight and rusts, and injurious insect pests, including the pear fruit borer, the

apple moth, etc. Provision is made for the importation under special permit of limited quantities of stocks, cuttings, scions and buds of fruits from the countries and localities above named for the purpose of keeping the country supplied with new varieties and necessary propagating stock. (Quarantine No. 44.)

I. ENTRY FOR IMMEDIATE EXPORT

Regulation 1. Permits Required for Entry for Immediate Export. The entry for immediate export of any prohibited plants or plant products shall not be allowed except on specific permit from the Secretary of Agriculture and under such conditions and at such ports of entry as shall be prescribed in the permit.

Regulation 2. Application for Entry for Immediate Export Must Be Made in Advance. Persons contemplating the entry for immediate export of any plant or plant product shall make application for a permit to the Federal Horticultural Board, Department of Agriculture, Washington, D. C., stating the quantity and exact nature of the plants or plant products, the country and locality where grown, the name and address of the foreign shipper, the port of departure, the port of arrival in the United States, the port and country of final destination, the name of vessel and steamship line bringing the plants or plant products to the United States, the name of vessel and steamship line to which the goods are to be transshipped for exportation, and the name and address of consignee.

Regulation 3. Permits Issued on Approval of Application. On approval of an application for entry for immediate export of prohibited plants and plant products a permit will be issued in quadruplicate. One copy will be furnished to the applicant for presentation to the customs officer at the port of arrival, one copy will be mailed to the collector at the port of arrival, one copy to the inspector of the Department of Agriculture at the port of arrival, and the fourth will be filed with the application. A separate permit will be required for each shipment offered for entry for immediate export.

Regulation 4. Notice by Permittee of Arrival of Prohibited Plants and Plant Products. Immediately upon the receipt by the permittee of authority for entry for immediate export of prohibited plants and plant products he shall submit a notice in duplicate to the Secretary of Agriculture, through the collector of customs, on forms provided for that purpose, stating the date of arrival, the number of the permit, the quantity, the exact nature of the plants or plant products, the country and locality where grown, port of departure, port of arrival in the United States, name of vessel and steamship line and dock, name and address of foreign shipper, and name and address of foreign consignee.

Regulation 5. Unloading for Entry for Immediate Export. Such plants or plant products shall not be unloaded for entry for immediate export until a permit for such entry shall have been received from the Secretary of Agriculture and until a bond shall have been filed with the collector of customs, with approved sureties, in double the invoice value of the property (the amount of the bond in no case to be less than $1,000), conditioned on the export of such property from the port of arrival within a period to be designated by the inspector of the Department of Agriculture in cooperation with the collector of customs. If not exported within the time thus designated, the articles may be subject to seizure and destruction by the collector of customs. The landing for transshipment of prohibited plants and plant products shall be by such methods and under such safeguards as shall be required by the inspector of the Department of Agriculture.

Regulation 6. Notice of Exportation and Cancellation of Bond. Immediately upon the exportation of such plants and plant products a notice in duplicate, on form provided for that purpose, shall be furnished by the permittee to the collector of customs, one copy of which shall be transmitted to the Secretary of Agriculture, stating the number of the permit, the quantity, the exact nature of the plants or

plant products, the country and locality where grown, name of vessel and steamship line bringing the articles to this country, port of arrival in the United States, name of vessel and steamship line taking articles from this country, date of exportation, and name and address of foreign consignee.

On receipt of said notice by the collector of customs the bond required from the permittee under regulation 5 hereof may be cancelled.

II. ENTRY FOR IMMEDIATE TRANSPORTATION AND EXPORTATION IN BOND

Regulation 7. Special Permit for Transportation in Bond. The entry for immediate transportation and exportation in bond of any of the plants or plant products described in these regulations, or which may hereafter be excluded by quarantine, is prohibited except on specific permit from the Secretary of Agriculture under such conditions as will be prescribed in the permit, when it can be shown that such transportation in bond through the United States can be so safeguarded as to routing and protection of shipment as to eliminate all possibility of risk to the plant cultures of this country.

Entry for immediate transportation and exportation in bond is prohibited of cotton seed, seed cotton and cottonseed hulls from any foreign locality or country, excepting only the locality of the Imperial Valley in the State of Lower California, Mexico.

Regulation 8. Persons Offering for Entry Prohibited Plants or Plant Products Except as Provided for in These Regulations, Liable to Penalties. Except as herein provided, the entry at any port of the United States, for immediate export or otherwise, of prohibited plants or plant products will not be permitted, and all persons offering such plants or plant products for entry at a port of the United States or bringing them into the limits of such ports will be liable to the penalties prescribed by the Plant Quarantine Act.

III. SAFEGUARDING OF PROHIBITED OR RESTRICTED PLANTS ARRIVING AT A PORT WHERE ENTRY OR LANDING IS NOT INTENDED

Regulation 9. Reporting of Prohibited or Restricted Plants. The master, captain or other person having charge or possession of a vessel arriving at a port of the United States, and containing as a part of its cargo or ship's stores or otherwise, any plants or plant products, the entry of which into the United States is either prohibited or restricted by quarantine or other restrictive orders of this department, shall be required, on arrival at the port, to submit to the Secretary of Agriculture, through the collector of customs, a report giving the name of the vessel, the nature and quantity of such plants or plant products, the country or locality of origin, the date of arrival at and date of sailing from the United States port, together with a statement indicating the steps taken to prevent the escape of insects or plant diseases which they may carry.

Regulation 10. Provisions for Safeguarding of Prohibited or Restricted Plants. The master, captain or other person having charge or possession of a vessel arriving at a port of the United States and containing as a part of its cargo or ship's stores, or otherwise, any plants or plant products, the entry of which into the United States is either prohibited or restricted by quarantine or other restrictive orders of this department, shall be required to permit such inspection and to take such measures as may be prescribed by an inspector of the Department of Agriculture to prevent the landing of any such plants or plant products, or the escape of insects or plant diseases which they may carry. Unless the protective measures required by such inspector are promptly taken, the collector of customs, in cooperation with the inspector of the Department of Agriculture may require the master, captain or other person having charge or posses-

sion of the vessel either to destroy the objectionable plants and plant products, or to remove them forthwith from the port and the territorial waters of the United States. The inspector of the Department of Agriculture may, if he considers it necessary, require the disinfection of the vessel in accordance with methods prescribed by the Department of Agriculture.

The foregoing regulations are adopted, effective on and after August 1, 1920, and amend and supersede the regulations promulgated October 20, 1917, which became effective December 1, 1917.

Done in the District of Columbia this 7th day of July, 1920.

Witness my hand and the seal of the United States Department of Agriculture.

[Seal] E. D. BALL,

Acting Secretary of Agriculture.

SPRAY PROGRAM FOR APPLES AND PEARS

Delayed Dormant Spray

Pink Spray

Calyx Spray

With very few exceptions, the regular spray program as recommended for the control of apple scab and codling moth should be followed in the bearing orchard. Frequent orchard inspections should be made, and where other pests and diseases are found, the proper application for their control should be given.

Application	Time Applied	Pest or Disease and Materials to Use
1. Dormant Spray. (See footnote.)	As the winter buds are swelling and before they open.	**For San Jose Scale, Red Spider Mite** and **Blister Mite** (Pear): Use lime-sulfur, 1-8, or miscible oil, 1-17. **For Leaf Roller***: Use miscible oil, 1-17.
2. Delayed Dormant Spray.	Pears: Cluster buds, scales separating. Apples: Young leaves separated just enough to expose blossom buds.	**For Scab and Mildew***: Use lime-sulfur, 1-30. **For Aphids:** Add nicotine, 1-1200. **For Bud Moth:** Add arsenate of lead, 4-200.
3. Pink or Pre-blossom Spray	When the blossom buds are well separated in the cluster, just before opening.	**For Scab and Mildew:** Lime-sulfur, 1-40. **For Bud Moth, Leaf-Roller, Pear Fruit Worms:** Add arsenate of lead, 2-100.
4. Calyx Spray.	Just as last petals are falling and before calyx closes on the main bud of each cluster.	**For Scab and Mildew:** Lime-sulfur, 1-40. **For Codling Moth** (apples only): Add arsenate of lead, 3-200.
5. Ten-day Spray.	Ten days or two weeks after the calyx application.	**For Scab and Mildew:** Use lime-sulfur, 1-40 or 50 (or self-boiled lime-sulfur, 8-8-50, if burning is feared). **For Pear Slug:** Add lead arsenate, 3-200.
6. Thirty-day Spray.	Four or five weeks after the calyx application.	**For Scab and Mildew***: Use lime-sulfur, 1-50 (or self-boiled lime-sulfur, 8-8-50, to prevent burning). **For Codling Moth***: Add arsenate of lead, 3-200. **For Green and Wooly Aphis:** Use nicotine, 1-1200.
7. July Spray.	July 10 to 25, depending on locality and season.	**For Codling Moth*** (second generation): Use arsenate of lead, 3-200.
8. August Spray.	August 5 to September 5, depending on season and locality.	**For Codling Moth***: Use arsenate of lead, 4.5-200. **For Anthracnose and Late Scab:** Add Bordeaux mixture, 4-4-50.
9. Fall Spray.	Late October or immediately after fruit is picked.	**For Anthracnose:** Use Bordeaux, 6-6-50, or lime-sulfur, 1-8. **For Pear Leaf Blister Mite* and Scale:** Use lime-sulfur, 1-8.

*When a pest or disease is marked with an asterisk (*), see special discussion regarding it on the pages following.

Footnote: Spraying for San Jose scale and Red Spider may be deferred until the Delayed Dormant (No. 2) if the strength of lime-sulfur in No. 2 is increased to 1-8.

SPRAY PROGRAM FOR PRUNES AND PLUMS

Application	Time Applied.	Pest or Disease and Materials to Use
1. Dormant Spray.	Just as the winter buds are opening.	**For San Jose Scale, Red Spider Mites and Twig Miner:** Use lime-sulfur, 1-8.
2. Pre-blossom Spray.	When the blossom buds are showing white just before opening.	**For Brown Rot* Blossom Blight:** Use Bordeaux, 4-4-50, or lime-sulfur, 1-30. **For Bud Moth:** Add lead arsenate, 2-100. **For Aphids:** Add nicotine, 1-1200.
3. First Fruit Spray.	As soon as the "shucks" or calyx parts are off the fruit.	**For Brown Rot and Leaf Spot*:** Use Bordeaux, 4-4-50, or self-boiled lime-sulfur, 8-8-50, with spreader. **For Syneta:** Add neutral or triplumbic lead arsenate paste, 7-100.
4. June Spray.	About June first.	**For Leaf Spot** (Beneficial for brown rot also): Use Bordeaux, 4-4-50, or self-boiled lime-sulfur, 8-8-50, with spreader.
5. July Spray.	About July first.	**For Leaf Spot** (Beneficial for brown rot also): Use same materials as in preceding.
6. August Spray.	About one month before picking time.	**For Brown Rot*:** Use Bordeaux, 4-4-50, or self-boiled lime-sulfur, 8-8-50. Add spreader.

*See special discussion on this particular pest or disease.

SPRAY PROGRAM FOR PEACHES

Application	Time Applied	Pest or Disease and Materials to Use
1. Leaf Curl Spray.	Any time from December to mid-February.	**For Peach Leaf Curl*:** Use Bordeaux, 6-6-50.
2. Late Dormant Spray.	Just as first buds are ready to open.	**For Peach Twig Miner, San Jose Scale, Red Spider Mite:** Use lime-sulfur, 1-8. (If scale is absent, dilute 1-12.) **For Aphids:** Add nicotine, 1-1200. **For Bud Moth:** Add lead arsenate, 2-100.
3. First Fruit Spray.	Just after the "shucks" or calyx parts fall off.	**For Peach Blight*** on fruit and leaves: Use self-boiled lime-sulfur, 8-8-50. (Many growers use Bordeaux, 4-4-50, with excellent results.)
4. Second Fruit Spray.	About two or three weeks after the preceding.	**For Peach Blight** on fruit and leaves: Use self-boiled lime-sulfur, 8-8-50.
5. Last Fruit Spray.	About one month before picking.	**For Brown Rot:** Use self-boiled lime-sulfur, 8-8-50. **For Bud Moth and Peach Twig Miner:** Add lead arsenate, 2-100.
6. Early Fall Spray.	As soon as the fruit is picked.	**For Peach Blight,** twig and bud infections: Use Bordeaux, 4-4-50.
7. Late Fall Spray.	About the first of November.	**For Peach Blight,** twig and bud infections: Use Bordeaux, 6-6-50.

*See special discussion on this particular pest or disease.

SPRAY PROGRAM FOR CHERRIES

Application	Time Applied	Pest or Disease and Materials to Use
1. Dormant Spray.	Just as the winter buds are beginning to open.	**For San Jose Scale and Red Spider Mite:** Use lime-sulfur, 1-8. **For Aphids:** Add nicotine, 1-1200, and apply Tanglefoot in band around trunk to prevent ants carrying aphids up the tree.
2. Pre-blossom Spray.	When blossom buds show white just before they open.	**For Brown Rot Blossom Blight*:** Use Bordeaux, 4-4-50, or lime-sulfur, 1-30, with spreader. **For Bud Moth and Syneta:** Add neutral or triplumbic lead arsenate paste, 7-100.
3. First Fruit Spray.	As soon as most of the "shucks" or calyx parts have fallen.	**For Leaf Spot* and Brown Rot:** Use Bordeaux, 4-4-50, or lime-sulfur, 1-50, or self-boiled lime-sulfur, 8-8-50. **For Syneta:** Add neutral or triplumbic lead arsenate paste, 7-100.
4. Second Fruit Spray.	Apply a month before picking time.	**For Brown Rot and Leaf Spot:** Use Bordeaux, 4-4-50, or self-boiled lime-sulfur, 8-8-50. **For Slug:** Add neutral or triplumbic lead arsenate paste, 7-100.
5. July Spray.	After the fruit is picked, or about first of July.	**For Leaf Spot:** Use Bordeaux, 4-4-50, or self-boiled lime-sulfur, 8-8-50.
6. August Spray.	About the first week in August.	**For Cherry Slug and Bud Moth:** Use lead arsenate, 2-100.

*See special discussion on this particular pest or disease.

STANDARD LIME-SULFUR DILUTION TABLE

Showing in columns 1, 2, 3 and 4 the number of gallons of water required for each gallon of concentrated solution to obtain the desired strength.

Hydrometer Test of Stock Solution		1 Dormant Spray (1-8) Gallons	2 Early Spring Spray (1-30) Gallons	3 Mid Spring Spray (1-40) Gallons	4 Late Spring Spray (1-50) Gallons
Baume Scale Deg.	Specific Gravity				
34	1.304	8¾	32	43	53½
32	1.282	8	30	40	50
30	1.260	7¼	28	37	46
28	1.239	6½	25½	34	42½
26	1.218	6	23½	31	39
24	1.198	5¼	21½	28½	35½
22	1.179	4¾	19½	26	32
20	1.160	4	17½	23	28

SIMPLIFIED LIME-SULFUR DILUTION TABLE

To make fifty gallons of dilute spray, use the quantity of concentrated lime-sulfur indicated in columns 1, 2, 3 and 4 for the different strengths, and dilute with water to fifty gallons.

Hydrometer Test of Stock Solution		1 Dormant Spray (1-8) Gallons	2 Early Spring Spray (1-30) Gallons	3 Mid Spring Spray (1-40) Gallons	4 Late Spring Spray (1-50) Gallons
Baume Scale Deg.	Specific Gravity				
34	1.304	5	1½	1	1 **
32	1.282	5½	1½*	1 *	1
30	1.260	6	1¾	1¼	1 *
28	1.239	6½	1¾*	1¼*	1¼**
26	1.218	7	2	1½	1¼
24	1.198	8	2¼	1¾	1½**
22	1.179	9	1½	2 **	1½
22	1.179	9	2½	2 **	1½
20	1.160	10	2¾	2 *	1¾**

*Means use a little over measure.
**Means use scant measure.

KEROSENE EMULSION

Kerosene emulsion is usually prepared as a stock solution and then diluted, as used, to the desired strength for spraying.

Whale oil soap ..... ½ pound
Water ..... 1 gallon
Kerosene ..... 2 gallons

Dissolve the soap in the boiling water. Remove from the fire and add the kerosene, stirring vigorously. The solution must now be agitated until it assumes

a thick creamy consistency that does not separate on cooling. This condition is most readily brought about by the use of a small bucket pump, forcing the solution through the hose and back into the container.

About a seven per cent solution will serve for most ordinary soft bodied insects. In some cases a heavier dosage is necessary, and in a few cases a weaker dilution is advisable. The following dilutions will probably serve all ordinary purposes. The figures are given on the basis of one gallon of the stock solution:

To obtain four per cent solution, add fifteen and two-thirds gallons of water.

To obtain seven per cent solution, add eight and one-half gallons of water.

To obtain twelve per cent solution, add four and one-half gallons of water.

To obtain fifteen per cent solution, add three and one-half gallons of water.

Kerosene emulsion is particularly effective against the aerial form of the wooly aphis and when properly prepared is a very effective contact insecticide.

Summer applications of oil sprays are best applied on bright sunny days when there is a slight breeze blowing.

BORDEAUX MIXTURE

This fungicide has been for a long time the most widely used material for controlling fungous diseases of plants. It is now being supplanted to a considerable extent by lime-sulfur and other materials, although for certain diseases Bordeaux is still the most efficient and safest preventive known.

Bordeaux mixture is a combination of copper sulfate (bluestone) and lime. For winter use it is generally made up in what is known as the

6-6-50 Formula

6 lbs. bluestone (copper sulfate)
6 lbs. stone lime (best grade)
50 gallons water

For trees in leaf it is often made up in the

4-4-50 Formula

4 lbs. bluestone (copper sulfate)
4 lbs. stone lime (best grade)
50 gallons water

Other proportions are also frequently used.

Manufacture. It is of great importance that Bordeaux mixture be properly prepared. It must be made fresh each time it is to be used. Stock solutions of bluestone alone or of lime alone may be kept almost indefinitely, but the mixed lime and bluestone solutions rapidly deteriorate on standing. The barrels or tanks in which Bordeaux mixture is made up and the container for the stock solution of copper sulfate should always be of wood, since the copper will attack and destroy iron. On this account it is well to have wooden hoops on the barrels. The stone lime used should be of the best quality.

IRON SULFIDE MIXTURE

"Iron sulfide mixture" made according to Ballard's formula (U. S. Department of Agriculture, Bulletin No. 120) has been found very successful for the control of mildew alone on apples in California. A simplification of this method is suggested for Oregon growers who may wish to experiment with this material.

4 pounds iron sulfate (copperas)
1 gallon lime-sulfur (33 degrees Baume)
200 gallons water

Dissolve the iron sulfate in a few gallons of water. Fill the spray tank with water, add the lime-sulfur and start the agitator. Add slowly the dissolved iron sulfate. A black precipitate will be formed. Enough lime-sulfur should be used to combine with all the iron sulfate.

DUST SPRAYING

This method of controlling orchard diseases has not been tested out in Oregon up to the season of 1916. While there appear to be some possible advantages in this method, yet there are certain possible drawbacks to be reckoned with. Since this method of dealing with orchard pests has not been given sufficient practical demonstration in the United States, growers are urged to be cautious about substituting the dust method for the tested and tried methods of spraying, until the fungicidal efficiency of the new method shall have been demonstrated beyond question by thorough tests under Oregon conditions, which, by the way, are distinctly unlike the conditions in any of the eastern states.

COMBINED BORDEAUX OIL EMULSION SPRAY

By Dr. C. A. Macrum

This emulsion spray was evolved by Dr. C. A. Macrum, commisioner for the Fourth District, State Board of Horticulture.

If applied as the buds are opening, before the blossoms appear, will control scab, San Jose scale, aphis, leaf roller, red spider, curl leaf of the peach, and the copper will be present to prevent the ravage of the anthracnose spore when the rains come in the fall of the year, and control the disease in prunes due to the cylindros porum.

The method of preparation is as follows: Prepare the copper sulfate solution in the usual proportions of one pound to the gallon of water, dissolve one and one-half pounds of common glue in one and one-half gallons of water, slack twelve pounds of lime, or stir twelve pounds of hydrated lime in water at time of using. Fill a 200-gallon spray tank three-fourths full of water. Pour twenty-four gallons of bluestone solution into the tank, start the agitator and add the lime milk slowly until a neutral solution is had. Test with litmus paper to tell when the solution is neutral. Add the one and one-half gallons of glue solution. Measure out twelve gallons of the General Chemical Company's No. 1 oil emulsion, or a corresponding oil emulsion, add a little water and stir until emulsion is started as shown by the mixture turning milky. Pour into the spray tank and add water to make 200 gallons. The agitator must be kept running during the whole procedure. The spray should be applied as soon as prepared.

The above are the proportions for a 200-gallon tank. In making stock solutions for a day's spraying the quantities given can be multiplied by the number of tanks required.

The strength of the Bordeaux can be varied as deemed necessary. The amount of copper sulfate in the above formula is the same as the ordinary 6-6-50. It is necessary that the Bordeaux solution be neutral and not alkaline as Bordeaux is ordinarily made. This is determined by adding the lime milk slowly, allowing the lime milk and copper solution to be well mixed, and testing with blue or red litmus paper to determine when the neutral point is reached.

If no rain follows the application of Bordeaux oil emulsion spray for 24 hours, the spray dries thoroughly and stays on the bark of the trees throughout the season, and is effective against anthracnose development after the fall rains begin.

"Lest We Forget"—Kipling

THE WILDER MEDAL

By Henry E. Dosch

The winning of this much coveted medal is an honor to any state and is sought after by all fruit growing sections of America and Canada. In order that the high value of this medal may be understood, and the reason why all fruitgrowers' societies and states, as well as individuals, are competing for it, and the winners are the recipients of the congratulations of their less favored friends, I will explain.

The Pomological Society of America comprises all the noted horticulturists and fruit savants, both professional and practical, actual growers of the United States and Canada. Sentiment or sectional favoritism has no place in the deliberations, and nothing but absolutely fruit of merit is taken into consideration by the committee on awards, of which Dr. F. M. Haximer, the veteran editor of the American Agriculturist, is and has been chairman for many years, a guarantee in itself that all favoritism is eliminated from their deliberations. Decisions are based strictly on merit, which is perhaps the principal reason why so high a value is placed on the Wilder Medal.

Origin of the Wilder Medal

The Pomological Society of America, which includes the British provinces, was founded some 85 years ago. Marshal P. Wilder, the veteran enthusiast in horticulture, was its first president and for many years filled that important position. It included among its members, then as now, all the noted fruit growers and horticultural professors. In order to stimulate the production of new varieties as well as perfect fruits, the society gave money prizes, which, however, for obvious reasons, did not prove satisfactory, and they decided on medals of award instead, and in honor to their president and promoter, the name "Wilder Medal" was given it.

When Mr. Wilder died he left a fund of one thousand dollars, the interest of which was to be devoted to silver and bronze medals for new fruits, most perfect fruits, largest collection of fruits of any given pomological variety, etc., to be awarded by its own members for pure merit, which has been religiously carried out ever since.

We entered fruits in the name of the State of Oregon, rather than as individuals, as "the most perfect fruit," so all could share in the honor and glory thus bestowed. We exhibited 250 plates of fresh fruits, against thousands of plates from other competing states. The immense size and high color of our apples, pears, plums and prunes, strawberries, cherries, peach plums, apricots, sugar plums and peaches was a revelation, not only to the committee of awards and other members of the American Pomological Society but also to the thousands of visitors, who were so profuse in words of admiration.

The winning of the Wilder Medal means much to Oregon. It is worth more to our State than all the medals and diplomas awarded to us at all the expositions, past, present and to come, as it is an honor no exposition, however large, can confer. The praises of the Oregon fruit exhibit will be sung and published, not alone in America and Canada, but in England, France and other European countries, and will do a missionary work at a stroke that years of advertising could not accomplish.

THE MUCH COVETED WILDER MEDAL

Contributors who made the winning of so high a prize possible are:

E. L. Smith, Hood River—Baldwin, Spitzenburg, Wealthy, Kay, White Winter Pearmain and Gravenstein apples.

William Arden, Milton—Twenty Ounce Pippin.

Asa Haladay, Scappoose—Gravenstein, Wealthy, Hislop, Siberian Transient and Crab apples.

B. G. Leedy, Tigardville—Three Tier Gravenstein apples.

W. J. Baker, Hood River; L. T. Reynolds, Salem; and J. C. Courtney, Portland—Bartlett pears.

L. T. Reynolds, Salem—Cherries, loganberries, Fellenberg (Italian) prunes.

Alexander Anderson, The Dalles—Fellenberg prunes.

Mrs. A. J. Armstrong, Portland—Fellenberg prunes and Egg plums.

Lewis Brothers, Russelville—Fellenberg prunes and Giant prunes.

Mrs. C. M. Shields, Freewater; Dr. J. R. Cardwell, Portland—Cox's Golden Drop plums.

Mrs. S. Sutton, Portland; A. M. Fleck, The Dalles; John Strahn, Freewater; K. S. & D. Fruit Land Company, Arcadia; H. C. Sholes, Portland; Emile Schanno, The Dalles; W. H. Taylor, The Dalles—Pond (Hungarian) prunes.

Henry E. Dosch, Hillsdale—Pond prunes, Dosch prunes and Robe de Sargent prunes.

Lewis Brothers, Russelville; T. V. Sluman, Mt. Tabor—Pacific prunes.

The contributors of strawberries, cherries, peach plums, apricots, sugar plums, Bradshaw plums, peaches, quinces, grapes, gooseberries and currants are:

G. J. Geasling Hood River; Mrs. Captain Angerstein, Portland; Mark Levy & Co., Portland; Cyrus H. Walker, Albany; W. J. Magoon, Portland; H. W. Prettyman, Mount Tabor; A. T. Webb, Portland; B. S. Huntington, The Dalles; Richard Scott, Milwaukie; L. M. Gilbert, Salem; S. S. Shields, Freewater; Fred Freudig, Freewater; M E. Kendricks, McMinnville; J. N. Scriber, La Grande; H. A. Lewis, Russelville; Mrs. C. M. Shields, Freewater; C. M. and G. G. Stackland, Cove; H. J. Geer, Cove; J. E. Courtney, Portland; E. M. McIntyre, Ashland; F. A. Reuter, Forest Grove; Dr. O. P. S. Plummer, Portland; and H. A. Carson, Grants Pass.

SOME NEEDS OF OREGON HORTICULTURE

By Professor C. I. Lewis

Readers of the biennial report of the State Board of Horticulture are naturally very much interested in problems which the fruit growers must face probably more than a dissertation on Oregon's opportunities in horticulture, or of what we are actually accomplishing. Horticulture is an interesting study, because it is always filled with problems, and one reason why we find so many strong men, mentally, engaged in horticulture, is because these men find a constant stimulus to their best mental endeavor. This can only result in one development, namely, a development along the lines of accomplishment, as a result of the powers of diagnosis which must come from a constant study of a subject which has severe problems to meet. In discussing some of these problems, we will consider them according to the fruit, and will first discuss the apple.

THE APPLE

One of the biggest problems before the Oregon apple grower is what we call the little apple. Even in some of our orchards from eight to fifteen years old, orchards which are vigorous and strong, there is found today a very large percentage of four and a half and five tier apples. Now there is no money in growing this kind of fruit. There is not now, and there will even be less in the future. The western apple has won its place in the market, partly because of large size, coupled with high color, freedom from blemish and superb quality, and while

the trade will reconcile itself to a small Grimes Golden, and at times small Jonathan, it will not accept the following varieties if they are small: Delicious, Winesap, Spitzenburg, Ortley, Rome and Winter Banana. There is, however, no excuse for our having small apples, and the small apple comes from allowing the tree to carry too heavy a load. We put off our thinning until too late in the season, or do not thin at all. If, together with this, we are shiftless in our methods of tillage, fertilization and general orchard practices, we must expect small apples. Every apple grower in Oregon should resolve that this next year he is going to strive to grow larger apples. It is one of our best weapons to use in forcing our product into new markets.

A second problem which the apple grower must consider is scab. For three years we practically had no scab, and as a result, growers got into careless habits. This past year has been a good scab year. The Oregon Agricultural College has given splendid advice on the control of scab. The delayed dormant and pink sprays are absolutely necessary if scab is to be controlled. This should be followed by the calyx spray, and, if scab should appear, by the ten day and especially by the thirty day spray. Scab can be controlled by systematic spraying.

A third problem is anthracnose. Fifteen years ago anthracnose was bad, until Dean A. B. Cordley, of the Oregon Agricultural College, showed us how to control it. We had very largely eradicated this disease, but this past winter was rather severe on trees, and seemed to weaken their vitality. The tissues on the main branches and trunk became weakened and the anthracnose ran like wildfire. The spraying as suggested by the college of Bordeaux 4-4-50 in August, and 6-6-50 as soon as the fruit is picked, will go a long ways toward controlling this disease. Inspection as early as March of each year by the orchardist of every tree which he has, and the cutting out with a sharp, clean cut, of any sores which start, should enable us in a year or two to eradicate this disease.

So many of the old home orchards, especially in the Willamette Valley, have been ruined the past winter, that these farmers now have a golden opportunity to establish a new home orchard, which will be really good. Let us not make it too large. A few trees are sufficient for a home orchard; we can produce from three to five varieties to a tree, and these varieties should be selected to give fruit good for eating and good for cooking, and to give the family fruit over a very long season. We can raise a garden in the orchard while it is young, and while the orchard is mature can perhaps use it as a chicken run, keep a few hogs in there, or mulch the orchard heavily with straw.

With a good barrel spray pump and such treatment as recommended, a splendid quality of delicious fruit can be produced for every home.

THE PEAR

Growers in the Southern Oregon district are beginning to realize that irrigation is going to be essential for the production of the large pear. Such pear growers should strain every nerve to see that where it is possible to irrigate the water be procured as soon as possible. We used to be able to sell the two inch pear, but the trade is demanding larger and larger fruit, and this coming year the canneries are going to require a two and one-half inch pear. Good tillage, a small amount of annual pruning, well distributed, and judicious thinning, will easily enable one to produce such fruit. Like the apple scab, the pear is also attacked, but the same methods of treatment outlined for the apple will also suffice for the pear. In speaking of pears, it is also interesting to note the rapid rise of the Bosc pear. This pear has topped the market this year, going higher than $7 a box, and Western and Southern Oregon can produce this fruit as can no other section of the world. The time is coming when the tonnage of this variety will be greatly augmented.

CENTRALIZED PACKING

Centralized packing is bound to come. It is interesting to note that this year the Oregon Growers Cooperative Association has packed over 95 per cent of its fruit in centralized packing plants. This generally means cheaper packing, more careful supervision, better inspection, and on the whole, better results. The more we centralize the grading and packing of our fruit, the better it will be for the good name of the state.

COLD STORAGE

When we look over the acreage of fruit in sight for the next ten years, and realize the tonnage which this acreage is to produce, and at the same time find there is one small cold storage plant at Ashland, two of limited capacity at Medford, and a forty car cold storage plant at Eugene, it is enough to make us shudder. The State of Oregon must have within the next five years a string of cold storage plants which can handle our fruits to advantage; otherwise the loss is going to be terrific. By cold storage, berries, cherries and Bartlett pears can be held much longer than otherwise would be true and hundreds of cars of our apples could be held until the market is right to receive them.

CANNERY FACILITIES

Ten years ago we were having meetings to see how we could get horticultural products plants and especially canneries in our state. We have seen fifty establishments come to Oregon, and the problem has been in the past year or two to give these plants sufficient tonnage. We have reached, however, the third stage of development, namely, the tonnage within a year or two is going to be greater than the present facilities and we must encourage the building of more canneries and other horticultural products plants in the state.

THE CHERRY

One of the outstanding features of cherry production this past year has been the marvelous crops produced in orchards which were properly pollinated. No longer can any one get up in a meeting and claim there is nothing in pollination. When one visits such orchards as M. H. Harlow's at Eugene, and John Thramer's, and sees the wonderful yields which these people secured, and realizes it is due very largely to good pollination, there is no longer any doubt on the subject. Cherry orchards which do not have proper pollenizers in them, should be budded and grafted over this winter, and a sufficient amount of pollenizers put in. In planting new orchards, one-third or one-fourth of the trees could be devoted to pollenizers. The Long Stemmed Waterhouse seems to be in a class by itself for such purposes, especially for the Royal Anne. The Waterhouse is itself a splendid cherry, being accepted by the canneries, and while at a lower price at times than that paid for Royal Annes, still it is more productive. It is interesting to note, also, that the cherry growers who have made the money this year are the fellows who till their orchards, who prune their trees, and who occasionally spray.

That old neglected orchard is rapidly becoming a thing of the past, and that cherry trees respond to tillage and pruning in the same way as is true of an apple or a pear tree. We are becoming more and more aware, also, that it is essential to choose the best of soil for cherries, as it is only on good soils, or soils in which the fertility is carefully studied, that one can expect the best results in cherry production. The cherry orchards of the future are going to be on mazzard roots; they are more resistant to gummosis, and seemingly are much more resistant to drouth conditions than any other stock which we have used.

DEFOLIATION IN PRUNE ORCHARD, CAUSED BY CYLINDOSPORUM LEAF SPORE

THE PRUNE

A survey of the prune orchards of the state will show that those growers who practice early, thorough tillage, have the best production. Too many growers still delay their tillage until May, or even late June. Such a practice will lead gradually to devitalization of the tree, and to the production of small prunes. Prune growers have been using fertilizers very vigorously. It is being observed that those growers who used nitrogenous fertilizers, either singly, as nitrate of soda, and manure, or in combinations where nitrogen is the principal ingredient, are getting the best results. While much can be said against the use of mixed fertilizers, in the way of economy, it is noted with interest that the past year or two, however, such companies are offering fertilizers which are rich in nitrogen. Up to a year or two ago, these fertilizers were generally low in nitrogen, and rich in phosphoric acid and potash, two elements which seemingly give us very little response. We caution growers, however, that a certain amount of nitrogen is a good thing, but that any good thing can be overdone. If the trees are already making good wood growth, have large green leaves and are producing large prunes, there is nothing to be gained by piling on an excess of nitrogen. But there are thousands of acres of trees, making little or no wood growth, having weak buds, and producing small fruit, that need nitrogen and need it liberally. This past season has demonstrated conclusively that had we had a dry season similar to 1918, which was 40 days in extent, we would have been facing a crop of 60,000,000 to 80,000,000 pounds of prunes; that within two years we can expect a crop of approximately 100,000,000 pounds of prunes. It doesn't take a mathematician long to figure that we do not have near enough driers to handle such a crop, and that one of the needs of the State is to build a large number of driers in the next two years; and let us urge every man who builds a drier to immediately take out good insurance on the same and to also cover the prunes as fast as they are dried. If he cares to, he can get daily adjustments on the tonnage in his plant, and while we admit the rates are high, still the annual losses demonstrate that these rates are warranted. Perhaps if we will all begin to insure carefully, we can gradually reduce the rates.

One of the most interesting developments in our prune business is the bringing out of new varieties and strains. At Forest Grove we find Mr. Rueter with a strain of Italian which matures a couple of weeks ahead of the regular strain. At Riddle we find Mr. Wilson with an Italian which blooms two weeks later, thus escaping the frost and yet which matures its fruit at the normal season. We find Mr. Johns at Myrtle Creek with several strains of Petites. We find Mr. Vercler introducing to the State a new prune, a cross between the Italian and the Petite. This prune has been called the New Oregon. We find Californians much stirred over Leonard Coats' production known as 1418, which is a strain of Petite. It is refreshing to find here and there a man who is still interested in plant breeding, such as A. A. Piper, of Myrtle Creek. Mr. Piper has two very interesting prunes, one a cross with the peach plum, the other, a cross between the Italian and Petite. They are both worth watching. Mr. Piper also has a new blackberry, has by artificial crossing reproduced the loganberry, has several strains of strawberries, and has a new sweet apple maturing in the fall, and a new pear, both of which have much merit. We need to read again the works of our pioneers in horticulture, such as the Llewellyns, Lambert, and Hoskins, Dr. Cardwell, and others, and get an inspiration from these men to try and reproduce some of the work which they have done. When we think of the Bing and Lambert cherry and realize the wonderful opporitunities for plant breeding in this state, we wonder why more men do not adopt this as a hobby to employ all their spare moments. Oregon should contribute in the next fifty years the world's choicest varieties of fruits.

THE LOGANBERRY

While the loganberry will grow in a wide range of soils, we are beginning to realize more and more the necessity of feeding this plant. The average yield is probably not far from two and a half tons, but we find patches which will run five, six, and occasionally the unheard-of yield of seven tons. These heavy yields are on good soils, are on locations where the grower is feeding the ground artificially. Loganberries must be put on well drained soil, must have thorough drainage, and must have plenty of food, especially that nitrogenous in nature. The crown borer is beginning to get bad in many portions of the state, and growers should keep in touch with entomologists at the Oregon Agricultural College and control this pest. Many of the new plants set out last spring died. This was due to two reasons: first, the hard winter; and second, too late tipping. September is seemingly the best month in the year to tip loganberries. Some growers can tip the loganberry to advantage before they dry prunes. Plants tipped in late November or December do not have the opportunity to form as good a root system and develop as vigorous a plant as those tipped earlier.

In conclusion, we want to urge upon the growers of the state to practice diversity. Not diversity for mere diversity's sake, but diversity with a resolution that everything we produce will be produced well. But let us not put all our eggs in one basket. A ranch which has four or five kinds of fruit to sell is on a sounder financial basis than one which has only one variety of fruit. While the man growing one variety may produce a higher grade, this is not necessarily so. He is, nevertheless, in a weak position, should a slump come in his line of fruit over a period of several years.

OREGON'S SWEET CHERRIES HAVE WON FAME

By L. T. Reynolds

While nearly all varieties of deciduous fruits are successfully grown in Oregon, the sweet cherry is particularly a Pacific Coast fruit, and several of the most valuable varieties were originated in this state.

Though grown in all parts of the state, the commercial cherry orchards are principally located in the Willamette Valley and in regions about The Dalles and Cove, in Eastern Oregon.

The commercial orchards are all of the large, sweet cherries, such as are not grown very extensively outside the Pacific Coast states.

The three varieties most grown are the Royal Anne, or Napoleon Bigarreau; the Bing and the Lambert. The Bing is a large, firm, black cherry of fine quality, especially valued east of the Cascades for its splendid shipping qualities, and is chiefly grown for marketing in the fresh state.

The Lambert, a beautiful, large, mahogany-colored cherry, is a great favorite in the Willamette Valley, and is grown both for shipping fresh and for canning. Both the Bing and the Lambert were originated in the Willamette Valley. They are unusually large and firm, standing shipment to any part of the United States. Their large size, beautiful color and unsurpassed flavor make them in demand whenever they are in the market.

The canned Lambert cherry is considered by many to be the best flavored canned cherry, and were the canneries to advertise this variety with special labels, as is done with the Royal Anne, a special demand for this variety might soon be created.

The Royal Anne, a large, light colored cherry, is the best known cherry in the canned cherry trade, and is more extensively grown for canning than any other. It is not a very good shipper, as the least bruise soon shows a discolored spot on account of its light color.

There are large canneries located in Portland, Salem and Eugene, with smaller canneries in a number of other towns of the State. In all of these the cherry pack is one of their principal products, and many carloads of this delicious canned fruit is shipped from the State each year. The Royal Anne is also barreled in large quantities for Maraschino purposes. These cherries are packed in barrels while fresh, covered with a brine and shipped to factories, where they are manufactured into various confections.

COMMERCIAL ORCHARDS LARGE

While the acreage in cherry trees does not compare with that in prunes or apples, yet there are a number of large commercial orchards and numerous smaller plantations. When the season is favorable the owners of dooryard trees also reap quite a harvest, and many city houseowners may be seen harvesting their cherry crop from two or three trees and taking it to the cannery, and a few large cherry trees on a city lot have sometimes almost paid the rent for the place for the year.

The crop for 1919 was light, yet there was produced and marketed 3,000 tons. Of this amount 1,000 tons were either canned or barreled in the plants at Salem, the Salem Fruit Union, The Hunt Brothers' Cannery and the Oregon Packing Company each packing about 250 tons of the fresh cherries.

During the past few years a large number of trees have been planted and the crop will normally continue to increase in quantity for several years. After reaching ten years of age the trees increase in their bearing capacity very rapidly, and the possible cherry crop of the state five years from now should be multiplied many times over the present bearing capacity of the trees.

Though more difficult to grow than some other varieties of fruit trees during the earlier years, after reaching ten years of age the cherry is not more subject to disease than other fruit trees. Owners having cherry orchards in suitable locations have usually found them very profitable, and the grower with a small orchard finds an added advantage in that the harvest comes much earlier in the season than his other fruits, bringing in an early cash return, as well as extending his period of harvest.

The canning price for Royal Annes for many years remained at about 5 cents per pound, but during the past few seasons the grower has received from 8 to 10½ cents per pound, and if yields were good, the crop has proved very profitable. Soil and location have much to do with the success of a cherry plantation and the intending planter should consult with practical growers before starting a young cherry orchard.

The cherry crop for the season of 1920 was somewhat unusual, since in some districts the crop was very light, while in other districts full crops were harvested.

The total crop of the state probably did not differ greatly from the production of the year 1919, or between 2,500 and 3,000 tons. A large portion of the crop was, as usual, used by the canneries, while smaller quantities were barreled, evaporated or shipped in the fresh state. The price to the grower was unusually good, the bulk of the crop having been sold at about 13 cents per pound.

This price, together with good yields, resulted in splendid returns to many of the growers. I quote the returns reported received by a few individuals in order to illustrate the possible income from a small cherry orchard. From one small plot of fifteen trees the producer received from the cannery a check for more than $300. Another, owner of six acres in cherries, received for the crop $5,750, while the owner of a ten acre cherry orchard sold therefrom last season a crop amounting to $8,000. These are only a few illustrations of the returns received by some of our cherry growers.

Pickers also received excellent pay for their labor, industrious pickers earning as much as $6 to $10 per day.

GRANDE RONDE VALLEY—COVE IN THE DISTANCE—THE PARADISE OF EASTERN OREGON

Estimating the yield for the state at 2,500 tons the past season of 1920, with an average price of $250 per ton, we have $625,000 as produced by the cherry growers of the state, while the amount coming into Oregon for the finished product must have exceeded this sum by a large amount.

HORTICULTURE IN OREGON

By Henry E. Dosch

Hon. W. H. Seward, in a speech delivered in the United States Senate as far back as 1852, said: "The Pacific Ocean, its shores, its islands, and the vast region beyond, will become the chief theater of events in the world's great hereafter."

This hereafter is here right now, perhaps much sooner than this great statesman anticipated, but he did not know then that he was standing at the threshhold of an electrical age, where events pass with lightning rapidity, and what is new today is old tomorrow. The new fields opened out to us offer one exceptional opportunity for the horticulturist in Oregon.

Oregon, the state of plenty, and which has long since earned the sobriquet as the "Land of red apples," is nothing if not a horticultural state. All fruits, including the tender olive and fig, do exceedingly well here.

Oregon is happily situated, that the planter can not only find the location best suited to the different varieties of fruits he wished to plant, but in addition has his choice as to the climate.

He can select Eastern Oregon with its extreme seasons, Southern Oregon tempts him with its enchanting valleys, clear skies and balmy air; then there is the Willamette Valley, of 200 miles or more in length, with its equable climate throughout the year; or, if fond of extreme seasons, the various valleys along our seacoast line. Oregon, therefore, offers an inviting field for the orchardist.

When the Creator of the Universe laid out the Garden of Eden and planted trees for ornament as well as fruit, he placed therein the first couple and intended them to be horticulturists. They were happy as long as they remained in their country home. But, in an evil hour, they left it, and ever since man has striven to place those who were given him to love and care for in a similar Garden of Eden. Perhaps nowhere on earth do they come as near to it as here in Oregon.

The arid lands of the vast Inland Empire, located east of the Cascade range of mountains, and especially along the canyons and flat areas of the Snake River, has proven wonderfully fertile under irrigation and under the management of progressive, up-to-date farmers and fruit growers. Canals have been dug varying in length from twelve to thirty miles, covering thousands of acres of these lands, which are now being brought into cultivation. I have repeatedly visited these regions, especially along Snake River, and have seen the transformation of a desert into an oasis. Hundreds of acres have been sowed to alfalfa, with surprising success, with an average yield of seven tons of hay per acre for the season, and which at this writing is selling for $25 per ton in the stack. Orchards planted to peaches, apples, pears and prunes, now in full bearing, are in a most perfect condition, both as to health, vigor, luxurious foliage and bearing capacity. It is almost beyond belief what water, under the control of intelligent endeavor, will produce on these soils. Along these benches is room for thousands of happy and contented homes, amid plenty to eat and drink, and pure, invigorating, healthgiving air to breathe; finer fruit and melons are not grown anywhere than right here.

The beautiful Grande Ronde, Wallowa, Burnt River, Powder River, Baker, Eagle Creek, Pine and numerous smaller valleys, scattered throughout these higher plateaus, and Blue Mountains, as well as Hood River, Mosier, Dufur and The Dalles valleys along the Columbia River, and which do not depend upon irri-

HILLCREST ORCHARDS—NEAR MEDFORD—OREGON

gation, are most fertile spots for the fruit growers. Perhaps nowhere do apples, pears, cherries, prunes, walnuts, almonds and strawberries grow to greater perfection as to size, flavor and color than in these valleys.

A paper was recently read at a Farmers' Institute held at La Grande in which the writer said: "At Cove—the garden spot of the Grande Ronde Valley—and here at La Grande, instances have been reported and verified where over five hundred dollars have been received for the product of a single acre of Jacunda strawberries, while there is no place under the sun where red raspberries do better than here." He considers the apple, the pear and the cherry the most profitable fruits for that locality. The fruits grown there, on account of the high elevation and climatic influences, have peculiar keeping qualities; the cherries, owing to the absence of rain during the ripening season, do not crack open and, by reason of so much sunshine, color highly and come into market late, and consequently always bring remunerative prices. The Hood River Valley and foothills have become especially famous for their apples and strawberries.

Southern Oregon, with its decomposed granite soils, as found in the Rogue River and Umpqua Valleys, offers the same advantage for horticulture and, at no distant day, will be a veritable paradise for the fruitgrower. Its soils are naturally very rich in all plant foods necessary to produce excellent fruit, combined with a climate unsurpassed anywhere in this fair land of ours. The vast mining districts of this section furnish a very good local market for the small grower, while most commercial growers will prefer and do ship their products to the East, England, Germany and France, where these fruits have found already a very profitable market; thus showing what these valleys can produce, and which opened another and unlimited market for the wide-awake fruitgrower. Intelligent endeavor, honest packing, brains and application of business principles which hereafter must be adopted in order to be successful in horticultural pursuits, has its own rewards. Peaches, apricots, pears, prunes, walnuts, almonds, chestnuts, filberts, grapes and melons grow in great abundance. The Rogue River Valley which is, in respect to soil and climate, like the famous Burgundy Valley in France, is the place par excellence for the growing of grapes which, under our prohibition law, will and are being used extensivley for our famous Oregon grape juice. Grapes of as good quality as those grown in California, France and Germany, for table use, are being produced in that valley.

The great and beautiful Willamette Valley does and always did grow fine fruits and is the oldest settled part of Oregon. Here flourish the apple, pear, prune, cherry, peach, apricot, walnut, almond, chestnut, filbert, all small bush fruits in great abundance, especially the grape and the now famous loganberry. All these fruits for size, color and flavor are not excelled anywhere, besides having advantage of nearness to the large local markets of our cities, as well as cheaper railroad and ocean transportation to the markets of the world.

The beautiful and fertile little valleys along the cost line are all more or less adapted to fruitgrowing, especially the apples and cranberries. One progressive experimenter has even now fruiting acres of the tender olive and fig. A little enterprise and energy will accomplish wonders in horticulture and viticulture in Oregon.

The French walnut, which I introduced into Oregon, is now coming into its own and has proven perfectly adapted to our soil and climatic conditions; the size and flavor of the kernels are equal to the best imported from Europe and is more prolific even than there; this fruit alone will be in a very few years at the head of all fruits grown in Oregon and is the best heritage a planter can leave to his family.

Horticulture is no longer an experiment in Oregon. The incessant drudgery, the numerous and keen disappointments which are peculiar to all new enterprises, and which horticulture in Oregon did not escape, are things of the past. We have reached the era of scientific management of the orchard and of remunerative

prices for the product, thanks to the scientific investigations of the professors of the experiment stations throughout the world, and to practical up-to-date fruit-growers. We know the soils best adapted for various fruits, the best varieties to plant for family use and commercial purposes. We also know what varieties to plant together for pollinating purposes. We know the diseases and insects infecting trees and fruits, and how to combat them.

When President Jefferson warned us that America would degenerate as soon as it ceased to be an agricultural and horticultural nation, he touched the key-

YOUNG APPLE ORCHARD IN WESTERN OREGON

note, for he foresaw the coming greed for money, that fearful fight for political power, that terrible unrest which seems to have reached its height just now; that getting something for nothing, and that struggle for social position and prominence.

Fruit growing is not only a healthy and pleasant occupation, but a profitable one. It has been proven year after year that those who have fruit to sell, whether it was raised alone or in connection with other crops, always have money to meet their obligations. It is stated on reliable authority (Bradstreet's Commercial Agency) that throughout the United States there are fewer failures among those engaged in horticultural pursuits than any other branch of farming, and then the question is asked: "Is it owing to the business or the men who engage in it?" I think it is both, especially the latter, for it requires brains to be a successful horticulturist. Horticulture is an art of the highest order. The planter

must keep abreast of the times; he must study and keep posted on the latest improved appliances.

Though fruit has been grown in Oregon for sixty-odd years, it is only recently that horticulture was reduced to a scientific basis. The backwardness, which was the ruling condition until a short time ago, was due to a lack of knowledge about planting and fruitgrowing. Very few growers were thoroughly equipped for the business in which they have invested their capital, and were it not for the fact that "crops never fail in Oregon," many more disappointments would have been recorded. The State took horticulture in hand and now supplies an abundance of practical information to all who care to ask for it. This information is distributed through the members of the State Board of Horticulture, the office of the Board and the faculty of the Agricultural College. There is now no reason for failure because of the absence of useful information about soils, stock selection, tree planting, cultivation, pruning, spraying and the science of pollenation. Progressive horticulture does wonders. It makes the old trees bear fruit again and gives the young ones a good start from the time they are set out. I have said that fruitgrowing is not only healthful but more profitable than any other agricultural pursuit, and while it is conceded that all various fruits can be grown to perfection in Oregon, the highest success can only be obtained by the intelligent painstaking orchardist. Brains are as essential on the farm and in the orchard as in the office or counting room. When Meissonier, the great French artist, was asked how he succeeded in painting such beautiful pictures, he replied, "I mix my colors with brains." The way lies through intelligent investigation of markets and methods, the application of brains to the agricultural and horticultural problems. We must study to please the tastes and notions of the world's consumers and must avail ourselves of the researches of the biologist, the bacteriologist, the entomologist and the investigations of the expert in crops and market conditions. Uninformed and unenlightened labor is at a great disadvantage these days of sharp trading and scientific adaptation of means to the end.

The State of Oregon offers relief. When I was honored by the Chamber of Commerce to represent Oregon's interests at the Nicaragua Canal Convention held at New Orleans in November, 1892, I closed my address, and which bears repeating, as follows:

You will find that the beautiful lines from William Cullen Bryant's poem,

"Where rolls the Oregon,
And hears no sound save his own dashings,"

are not, and have not been for a long time, applicable to this noble stream; for it hears the splashings and puffings of many steamboats traversing its bosom; it hears the whistles of the locomotives pulling transcontinental freight and passenger trains along its shores; it hears the pulsations of the mighty ocean steamers that carry the commodities of the Orient and Occident; it hears the cheerful songs and "Ahoy, boys, ahoy" of the sailors from vessels under the flags of many nations that carry our wheat, barley, oats, fruit, flour, lumber, fish and other products to the furthermost corners of the earth; it hears the lowing of cattle and bleating of thousands of sheep that graze its borders; it hears the buzz and whir of the sawmills that convert our forest giants of fir, spruce, cedar, oak, ash and pine into commercial products, even supplying the masts and spars and decking of the very ships that carry them to the markets of the world; it hears the hum of the steam roller mills that transform our fine wheat into flour to make the bread for many nations; it hears the click of the looms in the woolen mills; it hears the rumble of the electric light and power plants; it hears the songs of the birds that follow civilization into the wilderness; it hears the laughter of the children from thousands of happy homes skirting its banks, once the trail and the "illihi" of the Indian; it hears the bustle of life and activity of the villages and cities nestling along its shores; it now hears the hum of the aeroplanes that carry our mails, newspapers, freight and passengers from one

city to another; it hears the burring of the thousands of automobiles, loaded with joyous companions, along the magnificient Columbia River Highway, with its ever-changing scenic effect. Yes, the mighty Columbia still hears its own dashing, but it hears it in unison and harmonious chorus with the sounds of activity, civilization and commerce, where there is still room for happy and contented homes in regions of beautiful and majestic landscape for millions of people, which will be the richest operating field of the brain and brawn of the rising generation, the yeomen of our national supremacy.

Let it be remembered that a happy and prosperous citizenship is the controlling force and reserve power of our government, and all that contributes to the general welfare and happiness of the citizens strengthens the bulwark of our enduring nationality.

I feel confident that the welcome homeseekers, like so many before them, will thank their Creator for having selected the grand commonwealth of Oregon as their home.

OREGON

An Eye to See Nature, a Heart to Feel It, and a Resolution
That Dares to Follow It

I love thy rivers, deep and wide,
That slowly to the ocean glide
And mingle with Pacific's tide,
Oregon, dear Oregon!

I love thy hills of deepest green,
And flowery vales that lie between
Thy wheat fields with their golden sheen,
Oregon, fair Oregon!

I love thy valleys, broad and fair,
With orchards planted everywhere,
And fruit whose fragrance fills the air,
Oregon, sweet Oregon!

I love the mists that slowly rise
And veil the blue of morning skies;
I love thy sunset's brilliant dyes,
Oregon, bright Oregon!

I love thy giant towering trees,
That scarcely bend to strongest breeze;
Thy shrubs, the sense of beauty please,
Oregon, mild Oregon!

I love thy sombre lofty pines;
Thy tender, green luxuriant vines,
That round each rugged trunk entwines,
Oregon, wild Oregon!

Thy verdant plains by rivers' brim,
With scattered young trees, straight and slim,
Thy purple mountains soft and dim,
Oregon, sweet Oregon!

I love, I love, Oh! best of all
Thy distant mountains' giant wall,
With snow peaks, towering over all,
Oregon, grand Oregon!

For many centuries they've stood,
Through ages long, of storm and flood,
They've watched this country, fair and good,
Oregon, my Oregon!

THE CHERRY FRUIT FLY

(Rhagoletis cingulata Loew)

By. A. L. Lovett, Entomologist, Oregon Agricultural Experiment Station

Numerous reports have been received at the station during the past four years of serious injury to ripe cherries by the cherry maggot. This insect has been present in Oregon since about 1900. In an occasional season during this period late cherries have been heavily infested. It would appear, however, that the infestation is becoming more widely spread and of more frequent occurrence; that all medium and late varieties of cherries are frequently seriously injured, and that the status of the maggot as a pest of importance is increasing.

Affected cherries generally escape detection until the fruit is mature. Soon after picking, or where the ripe fruit is allowed to remain on the tree for a short time, the side of the affected cherry turns brown and shrivels, and small holes appear in the skin. An examination of the interior of the fruit reveals the fleshy white maggot in the decaying cherry pulp.

Description of the Fruit Fly

The larva of the cherry fruit fly is white or waxy yellow in color, slightly more than one-fourth inch long. It is a typical maggot form, blunt behind and tapering to a point at the head end.

The adult is a two-winged fly about two-thirds the size of the common house fly. The body is dark, the head and legs yellow. The most distinguishing mark is the conspicuous dark crossbands on the wings, figure 1.

Life History

The adult flies make their appearance in the orchard about the time the medium late varieties of cherries begin to show color. The date of their appearance will vary with the season but will approximate June 8 to June 18. The flies "sport" about on the foliage for a few days lapping up droplets of moisture or honey dew. After a period of about ten days, egg laying begins. The eggs are deposited under the surface of the skin of the fruit. These eggs hatch in from five to seven days, and the young maggots attack and tunnel through the pulp of the fruit. The time the maggot will spend within the fruit depends largely upon the degree of ripeness but will average about two weeks.

The maggots mature during late July, leave the fruit and drop to the ground. They tunnel down a few inches into the soil and transform to small reddish brown capsule-like puparia. Here they remain until the following spring, to emerge again as adult flies.

Injury

Late Duke and Lambert cherries are most seriously infested. Where seedling trees occur in or adjacent to the orchard, they usually afford a breeding place for the maggots, as they tend to ripen later and to hold the ripe fruit longer. In seasons when the ripening period for cherries is unduly prolonged, as in 1918, the general infestation of all medium and late varieties of cherries is to be expected. Royal Anns were very heavily attacked in 1918, some growers reporting an 80 per cent infestation. It is reasonable to assume, and field observations substantiate the theory, that infestation of the earlier white meated varieties is much more common than supposed. The maggots frequently have not assumed any considerable size at picking time and are rather inconspicuous in the white pulp and escape detection.

Poison Spray Bait

The use of sweetened poison sprays as a bait for the adults of fruit flies has been recommended for years. This treatment has been found very successful for

the control of the cherry fruit flies in Eastern United States and Canada. Our experiments were, therefore, confined to field tests under Oregon conditions to determine if the treatment would be equally effective here.

FIG. 1. ADULT CHERRY FRUIT FLY (RHAGOLETIS CINGULATA) SHOWING GENERAL APPEARANCE—ENLARGED

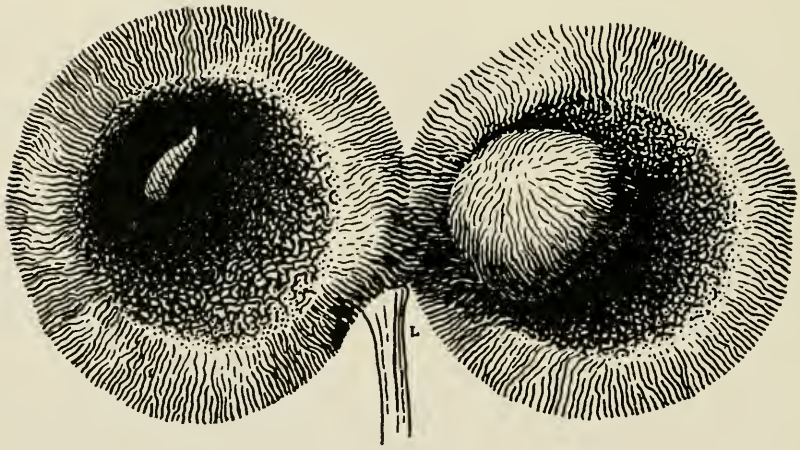


FIG. 2. CHERRY FRUIT—SHOWING MAGGOT OF CHERRY FRUIT FLY

Field spray tests were made at Newberg and Salem in 1918.* Unfortunately the applications were put on a little too late for most effective results, as the adults were already busily depositing eggs when the spray was applied.

Similar tests were made in 1919, the time of application being more carefully planned. Excellent results in maggot control were obtained.

In observations of orchards in the Cove section of Union County, Oregon, where the maggot has been present and fairly serious for years, it was found

*The field tests were made by Mr. A. B. Black, formerly assistant in this department.

that where applications of the regular lead arsenate spray, two pounds to one hundred gallons, as applied for the cherry slug were made, the poison present was successful likewise in effectually checking the maggot.

The formula for the poison bait spray is as follows:

Sodium arsenate, one-half pound
Brown sugar, two and one-half pounds
(Or syrup, two quarts)
Water, eight gallons

Three applications should be given: The first, when the adult flies appear. This will be about the time the Royal Annes show good color, or about June 8 to 20. The second application should be given about ten days later, and the third about one week after the second. Two applications will probably suffice if carefully timed and in case no showers of rain occur. Rains will discount the effect of previous applications and necessitate a repetition of the spray.

In applying the spray, take care to use no more material on the tree than necessary. About one pint to one quart of spray to the tree is sufficient. Heavy applications do no more good in maggot control and may seriously burn the foliage. Endeavor to apply this amount as fine misty droplets to the upper surface of the outer leaves. Spray the foliage of adjacent trees and shrubs as well.

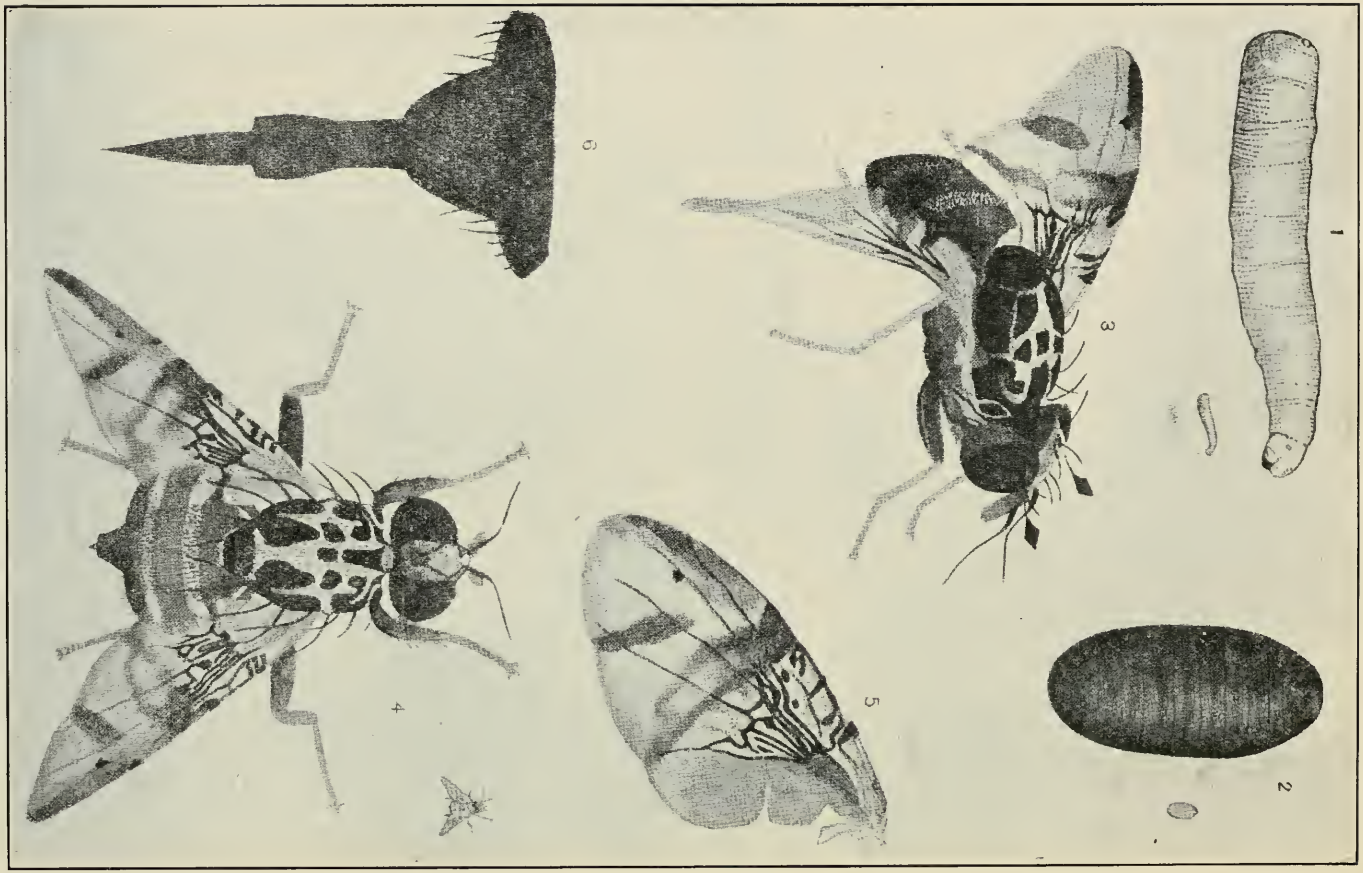
THE MALLY FRUIT FLY REMEDY

For the Prevention of Maggots in Fruit by the Destruction of the Parent Flies Before Eggs Are Laid

(Issued by the Union Division of Entomology, 1915)

There are two closely related flies in South Africa, one a native species, the other introduced from abroad. The native species predominates in Natal, the introduced in the Cape and Free State, and both abound in the Transvaal. Both flies are brightly colored and in general appearance similar to one another; they are somewhat smaller than house flies with iridescent spotted wings, shining metallic eyes, and gray and yellow-brown bodies. Together they are spoken of as fruit flies, and constitute one of the principal fruit pests of South Africa. Almost all kinds of fruit are attacked, more especially apricots, peaches, nectarines, apples, pears, quinces, mangoes, guavas and oranges. The damage begins when the female fly deposits its eggs in the fruit, from which come the well-known maggots that spoil the fruit for ordinary purposes.

The life history of the insect is briefly as follows: When apricots and peaches begin ripening in December the females deposit their eggs just underneath the skin of the fruit. In two to four days the eggs hatch, and the maggots at once attack the tissue of the ripening fruit; in two to three weeks, depending on the ripeness of the fruit and the weather conditions as to temperature, the maggots are fully developed and leave the fruit. On leaving the fruit they enter the ground to a depth of one to two inches and transform to the "puparium" or resting stage; this stage lasts for about two weeks and then the adults or "flies" emerge. After emergence they spend several days feeding on any sweet substance that may be available, and as soon as the eggs are sufficiently developed the females puncture the fruit and deposit them. Fruit flies are very prolific, and during the summer months a generation will mature about every four weeks. It is therefore easy to account for the great abundance of maggots during the summer, when stone fruits are abundant. During autumn and winter—the citrus season—they do not develop so rapidly. It has been shown that the flies can live for five months or more when confined in a cage during the winter, if they have access to a sweet of some kind on which they can feed occasionally. Under natural conditions they are no doubt able to wait for some time for fruit to ripen.



THE FRUIT FLY

1, Maggot; 2, Puparium; 3, Male Fly; 4, Female Fly; 5, Wing; 6, Ovipositor extended. The small figures are life size.

Experience in South Africa during the last six years has shown that by using the Mally Fruit Fly Remedy, fruitgrowers in town and country alike need not suffer the loss of their fruit on account of the fruit fly.

The remedy consists in sprinkling a very small quantity of poisoned bait—a dilute syrup rendered poisonous by the addition of arsenate of lead—at frequent intervals over the trees whose fruit it is designed to protect. The remedy acts by fatally poisoning the flies that would otherwise sting the fruit and deposit eggs that would develop into maggots and spoil the fruit. The bait should be prepared as follows:

Sugar, 2½ lbs. or 25 lbs.
Arsenate of lead (paste), 3 oz. or 2 lbs.
Water, 4 gallons or 40 gallons

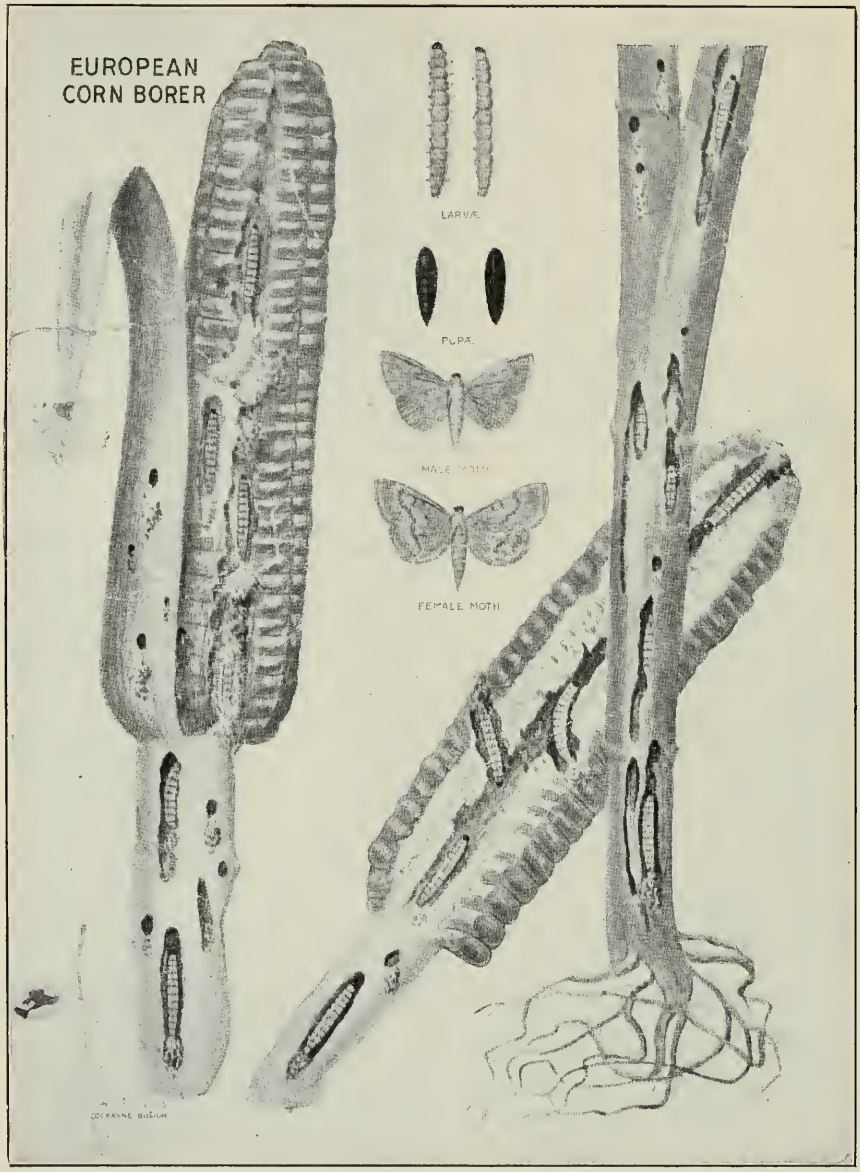
The lesser quantities are for a parafin tin, the larger for a barrel. The arsenate of lead should be thoroughly mixed with a small quantity of water and then stirred into the bulk. The sugar may be poured into the full amount of water and stirred till it is all dissolved. The proportion of arsenate of lead is more than ample to ensure the death of flies that take the bait, and is about as much as can be used with safety to the foliage of peach trees. Rain water (from an ordinary tank) is preferable to that from a stream.

Made as recommended, the bait does not attract bees to an appreciable extent, but house flies and a number of other species feed on it to their destruction.

An ordinary garden syringe is the best means of distributing the bait.

The finest "rose" on the syringe should be used, and only a very small quantity of bait should be applied to each tree—about a pint to a tree about 10 feet high and 10 feet wide. It is particularly important not to overspray stone fruits owing to their extreme liability to injury. The man should walk around the tree, keeping two or more yards away, and should distribute the spray in a series of short squirts directed so that the liquid will fall in innumerable small drops over and through the tree, and with no more in one part than another. A single fill of the syringe will often be enough for one tree, and thus the man will be back at the starting place by the time the syringe is empty. The mixture should be stirred before each filling of the syringe in order to ensure uniformity of strength.

The number of applications necessary to protect a crop will vary with local conditions and with the season. The aim should be to have poison present as long as there are fruit flies about to take it. Where citrus, mango, guava or loquat trees are present they should be given one or two preliminary baitings during October so as to destroy any fruit flies that may have harbored there during the winter or that may arise from maggots in any late maturing fruits. This will prevent the flies migrating to summer fruit later on. The first application should be made to the earliest susceptible kinds of fruit by the time they are half-grown and repeated every seven to fourteen days, depending on the prevalence of the pest in the vicinity. As rain will dissolve and wash off the sweet ingredient and leave the specks of poison in unattractive forms, the baiting should be repeated after every rain or during bright spells in rainy weather throughout the fly season. Very likely a single application every three or four weeks will suffice after midsummer, especially if there has been a succession of early treatments, and if neighbors close by have also adopted the treatment, and if, at the same time, reasonable care has been taken to collect and destroy fallen fruit. Hedges, vines, coffee plants and ornamental shrubs, as well as wild fruit plants—prickly pear, passion plant, granadilla, blackberry or bramble, Kaffir plum, Kei apple or Dingaan apricot, etc.—in or immediately bordering on the garden or orchard, should be treated so that they will serve as "carriers" to keep bait available for fruit flies that may be harboring there or that may alight to rest on their journey from nearby untreated premises.


EUROPEAN
CORN BORER
LARVÆ
PUPÆ
MALE MOTH
FEMALE MOTH

The later maturing kinds of fruit—late peaches, apples, pears, quinces—should be baited when half-grown and the baiting continued till the fruit is all off. Where citrus fruit is the main crop it is advisable to bait these late summer fruits for two or three weeks after the fruit is off so as to destroy flies emerging from the soil beneath promptly, and thus prevent their migrating to the citrus orchard. This is an important matter, because fruit flies may bring about serious loss to shippers of citrus fruit by stinging the fruit in attempts to oviposit, and thereby injure the surface sufficiently to serve as a point of entrance for organisms that cause the fruit to decay on the way to market. Quite a number of different species of flies try to feed on the surface of citrus fruit, especially if there are specks of honey dew from scale insects or aphides present. It is possible that they also cause injury sufficient to induce decay; these the bait will also destroy.

If grapes are attacked it is fairly certain that peaches or other summer fruit nearby have been badly infested, and that the resulting flies have found their way to the vineyard. Baiting the fruit trees will do much towards preventing injury to grapes. If infestation in grapes is feared, the vines should be sprinkled the same as in the case of fruit trees.

Experience only will enable one to decide on the necessary number of baitings under any given circumstances. Advice from those who have had local experience should be obtained whenever possible. The bait costs so little and is so easily applied that it is best to err on the right side and bait frequently. Much depends on convenience. All materials should be kept in a safe but handy place, so that time will not be wasted in getting ready for work, but the bait should always be freshly made.

Where town gardens or other small holdings are concerned, interested parties should cooperate and arrange for some one to distribute the bait regularly for all of them.

Caution.—There is no necessity to sprinkle the fruit itself. Reasonable care should be taken not to put bait on to the fruit, but if a few drops do strike the fruit there is no cause for alarm, because the amount of poison is so small that it is impossible for any one to eat enough fruit at one time to get an injurious dose of arsenic.

Do not leave tins or other receptacles containing bait standing open in places where animals can get at them and drink the poison solution.

Keep the jar or tin containing the arsenate of lead tightly closed so as to prevent loss of moisture, and put it away in a safe place where children or irresponsible individuals cannot get access to it.

EUROPEAN CORN BORER

(Pyrausta nubilalis Hubn.)

By E. P. Felt, State Entomologist of New York

This serious pest is now well established over large areas. It occurs in eastern Massachusetts from Cape Cod to the northern boundary of the state, with a westward extension in places of thirty miles, and an invasion of several towns in southeastern New Hampshire. It is found in New York State over large areas, the eastern infestation centering approximately on Schenectady, and the western one extending from Buffalo south and southwestward along the Lake Erie shore nearly to the Pennsylvania state line, and with a southern extension from the lake shore of about ten miles. There is also an infestation in Ontario, Canada, extending from Fort Erie westward to Dunnsville, and an apparently independent and more seriously infested area around St. Thomas, the east and west limits in this latter being some sixty miles and the north and south dimensions approximately forty miles.

There has been severe injury in restricted areas about Boston, Massachusetts, where there are two broods, and generally speaking comparatively slight damage in the New York areas with but one brood in a season, though a single generation produced from 70 to 90 per cent of infested corn around St. Thomas with possibly 50 per cent of the ears affected, and caused a commercial loss in some cases approximating 20 to 25 per cent.

The European corn borer attacks all parts of the plant except the fibrous roots. The young borers work in the developing tassels, the older ones tunneling the base and causing a characteristic lopping. The bleeding holes and wet borings on corn stalks and ears in midsummer are comparatively conspicuous signs of this pest. Its presence in corn stalks and corn stubble in late fall and winter is indicated by characteristic holes about one-eighth of an inch in diameter, generally with discolored margins and usually plugged with borings. The holes lead into irregular burrows or galleries from one inch to several inches in length, each of which is inhabited by a yellowish-gray, brown headed, minutely brown spotted caterpillar about three-fourths of an inch long. The moths fly in eastern Massachusetts from the middle of May to the latter part of June, and again the last of July and early in August, depositing masses of eggs (700 or more per female) on the under side of the leaves. The insects fly in New York State, where there is but one brood, from the middle of June to the last of July. Borers may be found at work shortly after the eggs are deposited and until the close of the season, the full grown or nearly full grown caterpillars wintering in corn stalks, corn stubble, cobs and the stems of various plants.

The European corn borer breeds by preference in the different varieties of corn, causing most injury to the smaller sweet and flint corns. It also breeds freely in eastern Massachusetts at least, as shown by federal investigations, in barnyard grass, cocklebur, dahlia, hemp, Japanese hop, horseweed, Mexican tea, pigweed and smartweed. About thirty other plants are frequently infested in eastern Massachusetts, and the stems of a considerably larger series may be invaded, particularly if growing near preferred food plants. Over 150 of the plants growing in eastern Massachusetts may be more or less infested by this insect. The breeding in other plants than corn appears to be largely restricted to the second brood and, consequently, in areas where there is but one generation, as in the infested territory of New York, there is a very slight infestation of other plants, it being practically limited to those growing in the near vicinity of corn. The probabilities favor two broods in at least the warmer corn growing areas of Oregon.

It is very desirable to prevent the spread of this pest through the shipment of infested plants or parts of plants, and to accomplish this, rigid quarantine regulations have been established by the general government and the authorities in a number of states. Corn growers in the infested areas of New York State have been urged to handle corn and corn land in such a way as to reduce to a minimum the probabilities of borers surviving, special emphasis being laid upon cutting corn close to the ground and putting as much of the crop into silos as possible, the remainder of the crop to be cut or shredded, so as to promote clean consumption by stock, or else provision made for the burning, burying or submerging in water of the waste portions.

SUCCESS IN APPLE SCAB CONTROL

By H. P. Barss, Plant Pathologist, Oregon Experiment Station

There are some sections of Oregon that have learned the spraying game and are now making a fine record by the production of an unbelievably high percentage of perfect fruit which means, of course, high profits to the individual growers. In some of the newer orchard sections, particularly in the Willamette Valley, the results of the 1920 season indicate that many of the apple growers have not

learned the game or have failed to equip themselves with spray outfits adequate for the work, for the losses from scab alone, not to mention codling moth, have run up into many thousands of dollars, an average of 50 per cent culls having been reported from some districts of considerable size. That this could have been prevented is shown by the fine results from systematic spraying obtained by certain individual orchardists in these same sections. Perhaps some explanation of the requirements for successful scab control might be helpful to growers who do not want to repeat the experiences of the past.

Hood River growers, in a climate favorable for scab, have adopted a spray program of four to five spring sprays for scab control, two of these being combination sprays for codling moth prevention. The reason they put on so many scab sprays and follow up with the number of codling moth sprays which they regularly give, is that they have proved to their own satisfaction that it doesn't pay to omit any step in this schedule of applications. They have come to feel as though the omission of one application would be much like hanging out a sign in front of the orchard reading "Welcome Apple Scab." There was a time when Hood River growers had not learned the secret of successful fruit protection. Enormous losses were sustained from scab in some seasons. Then along came the Oregon Experiment Station at its Hood River branch, studying the situation through several years of investigation under the direction of Winston and Childs. As a result of this work it was discovered that the Pacific Slope fruit sections require one more spray application for succesful control than other sections of the United States were giving. This extra application is the one put on at the beginning of the growing season, just as soon as the tiny leaves surrounding the blossom clusters have turned back far enough so that the spray can reach the little, close-packed, undeveloped group of flower buds in the center. This has been called the delayed-dormant or early cluster application. It is the spray that nips scab in the bud.

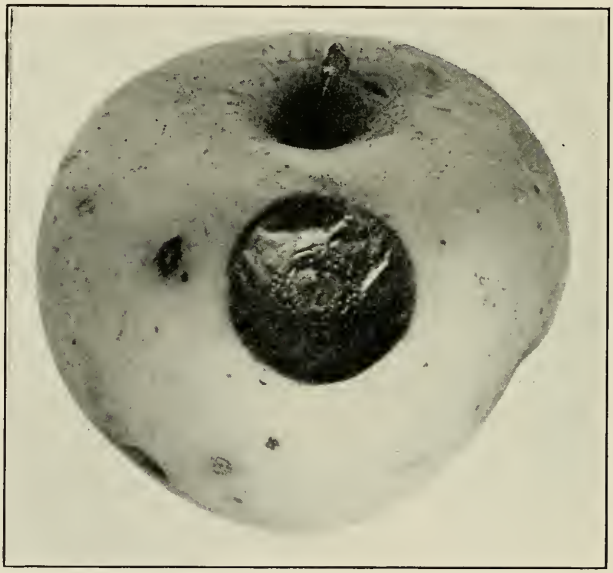
RIGHT STAGE FOR FIRST APPLE SCAB SPRAY

In the early days of plant disease investigations it was found that apple scab was carried over from year to year on the old apple leaves of the previous season, and practically only in this way. It was formerly the general scientific opinion that the spring discharge of scab spores from the old leaves on the ground began about the time the blossoms opened, but several years ago I found that under the climatic conditions existing in Western Oregon these spores were discharged from the old leaves as early as February, and this was confirmed by the Hood River Station where Childs found that spore discharge started as soon as the snow was gone, and that it continued right along at every rainy spell until June. Spores, therefore, are in the air of the apple orchard even before the tender leaf tips begin to poke out from the bud scales, ready to infect the emerging parts whenever a wet spell makes it possible.

These facts explain why it was that apple scab could get a serious start in the orchard before the usual "pink" or pre-blossom spray was applied, and it is easy to understand why immediate improvement in control occurred when, after this discovery, the growers began with the early cluster (or delayed-dormant) stage and followed with the other usual sprays. Western Oregon growers who are getting the best results are putting on two separate applications before the blossoming period. Then they follow with two or three more through the moist spring weather. Of course summer applications for codling moth rust must be given besides.

Apple growers, or at least some of them, used to think that all that was necessary in scab spraying was to spray the fruit, believing that there was no need for any protection except for the fruit. They soon realized their mistake, however, for scab readily attacks all foliage and, if left unsprayed, the leaves produce in a short time countless myriads of spring spores which sift down onto the fruit continually. If the fruit were perfectly and completely covered, and if the fruit skin did not stretch with growth between sprayings, we might expect the apples to remain uninfected in spite of this shower of spores, but as a matter of fact, the skin does stretch, and no grower can actually cover every particle of every fruit perfectly. The high degree of unblemished fruit that many growers secure is, therefore, obtained only by combining thorough fruit spraying with thorough covering of the foliage at the same time.

Where a good many growers fall down is in not having equipment sufficient in size or capacity to do the work. The kind of outfit or the number of machines



APPLE TREE ANTHRACNOSE FRUIT ROT

which did the work successfully when the orchard was young often cannot be expected to do the work when it comes into bearing. Of course, spray outfits are expensive, but so are scab and codling moth and aphids. The grower cannot afford to purchase more than he actually needs, but neither can he afford to provide himself with less than he needs. In the larger orchards the new high-powered, big capacity outfits with spray guns to replace the old extension rods and small nozzles, are giving excellent results, with the advantage that the work is done more rapidly; that is, more ground is covered in the same length of time than with the old equipment, and the work is far less tiring to the operator. Moreover, just as good work is done where reasonable skill is employed. It has been the hope of many that dusting would prove successful for pest control, but in the tests in Oregon (See Oregon Exp. Sta. Bul. 171, by Childs), the effectiveness of the method under our conditions has been disappointing.

Another source of trouble may be referred to here. A great many growers have lost heavily from unwittingly allowing a lot of scab to develop in the fruit

in the tops of the trees, because in the upper portion completeness of covering is often nearly impossible because of the height of the trees. Growers have not adopted the use of towers as rapidly as the growth of the trees demanded. Immediate improvement always results where one man is put to working on top of the tank or on a tower whenever mature trees must be sprayed with the ordinary outfits. Another help to better spraying that has been adopted by a good many growers, in the last year or two especially, is the use of copperas or iron sulfate added to the ordinary lime-sulfur after the latter has been put into the tank. This results in a chemical action which does not destroy the practical effectiveness of the spray, although it turns it black in color. The black color makes it possible for the sprayer to see at once just where his spray hits and whether it is in the form of a fine mist or of coarse particles, etc. He can do a better and more thorough job, because he can see what he is doing. His hired sprayers also will do a better job, for he can tell just what sort of work they are doing.

APPLE SCAB ON FRUIT

One more suggestion may be made. It is well known that if the old leaves in an orchard are completely turned under during the winter and before the buds begin to unfold in the spring, the amount of initial scab infection will be greatly reduced. In the Hood River Valley this method has been tested occasionally with very little evidence of effectiveness, but that is doubtless because, surrounded on all sides by other orchards not similarly handled as they were, the test blocks suffered from the abundant entrance of scab spores from without. In sections where the orchards are more isolated the practice of plowing the old leaves under should be practiced where the soil conditions and weather conditions will permit. Where there is a cover crop growing vigorously in the orchards, such as alfalfa or clover, it is thought by some that the overlying blanket of the cover crop may prevent to some extent the successful passing of spores discharged from the old leaves up into the air of the orchard. At any rate experience has shown a decrease in scab trouble where cover crops have become general, perhaps, however, only because better spraying methods have gone hand in hand with general improvement in orchard practices.

THE INDIAN MEAL MOTH

(Plodia interpunctella Huebn.)

By A. L. Lovett, Entomologist, Oregon Agricultural Experiment Station

Of a variety of serious pests of stored food products, cereals, evaporated fruits and vegetables, walnuts and confections in the Northwest, the Indian meal moth is by far the most generally destructive.

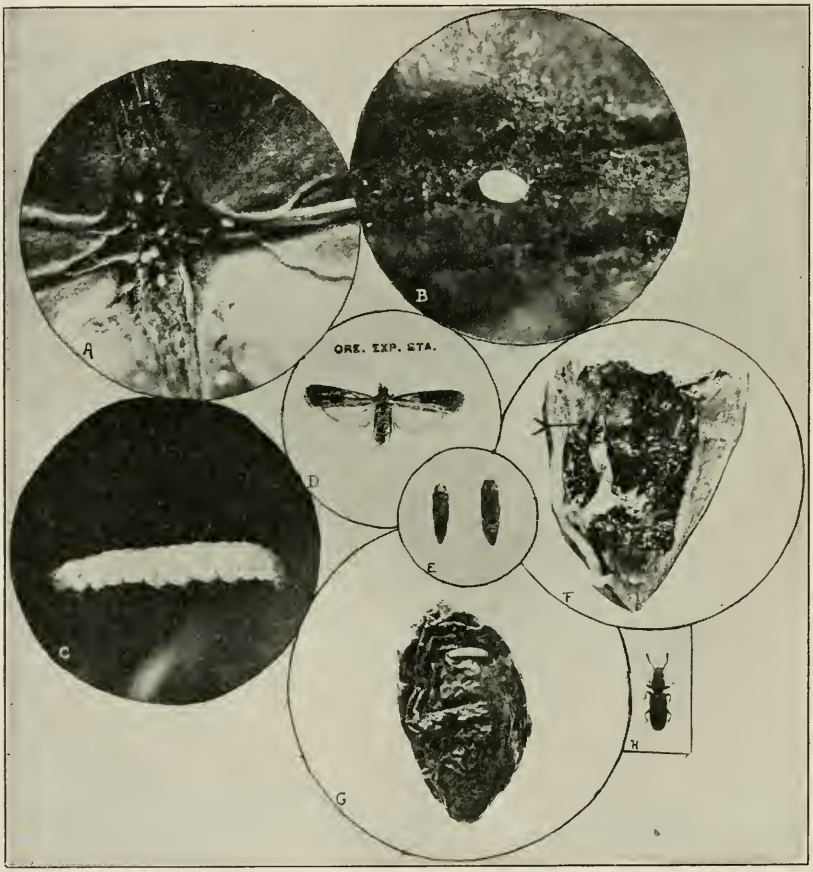


FIG. 1 THE INDIAN MEAL MOTH (PLODIA INTERPUNCTELLA)
a. Eggs on walnut; b. Egg much enlarged; c. Larva; d. Adult moth; e. Pupa; f. interior of infected walnut showing pupal case; g. Larva on prune; h. Saw-toothed grain beetle, a stored product pest. (After Wilson.)

As a serious pest of mills, warehouses, granaries and of cereal food products in the home, it has long been recognized. A particularly serious aspect of its destructiveness in Oregon, however, comes with its wholesale injury to dried prunes, walnuts and evaporated fruits and vegetables generally. Confectionaries likewise experience serious losses from the attack of this pest on chocolate candies and dipped nuts.

Life History

As with the majority of the stored food product insect pests, the Indian meal moth may be found in all stages of development throughout the year. Generation follows generation, the cycles becoming more or less confused, depending on temperature, food supply, etc.

Eggs are deposited more or less promiscuously by the adult moths, either on the food itself where exposed, on the carton or container, or on the walls, floors or similar situations adjacent to the product. One female moth may deposit from 275 to 350 eggs.

The eggs are a dull white in color with a slight lustre, the surface roughened. They are very small, barely visible to the naked eye. The eggs hatch in about four to eight days, and the young active larva seeks about for food. It will eat through the softer stem end of a walnut hull, discover cracks, tears or any possible openings in cartons or containers and work its way to the interior. Where once a package is infested the moth can breed indefinitely within the container until the food contents are reduced to a mass of web and frass.

The average larval stage is about 60 days. It is as a worm that the pest attacks food products. In addition to the actual destruction of food, the worm spins webs and promiscuously scatters excrement through the product.

The mature worm transforms to a pupa within the food product where the larva feeds. The pupa is reddish brown in color, slightly less than one-fourth inch long. From ten to twenty days are passed as a pupa. The adult insect then emerges from the pupa case.

The adult moth measures about one-fourth inch in length. The Indian meal moth is very conspicuously marked. The general ground color is a grayish brown. Across the shoulders is a conspicuous white band, the outer third of the wings being brown with some lustre. The moths are normally night fliers. They fly readily, moving with a zig-zag flight. After mating the females seek favorable positions for egg laying.

The Injury

As intimated earlier, the general injury to cereals and household products becomes of secondary importance beside the serious injury and menace to our commercial horticultural interests in the attack of the pest on English walnuts, dried and evaporated fruits including prunes, loganberries, raspberries, etc., and evaporated vegetables.

The initial infestation is a comparatively simple process, as the moths are present and active at all times of the year. A single sack of infested walnuts may serve to contaminate an entire lot where held in storage for any length of time. Dried or evaporated fruit left for a time in open bins, as is the general practice, is subject to infestation. Then later in the packed cases the breeding and destructive work of the moth continues with increasing seriousness. Dried loganberries and prunes packed in the West apparently free from infection, when opened in the eastern market have been found a mass of worms, web and excrement. Evaporated vegetables held for a time have been condemned as unfit for human food because of the activities of this pest. Walnuts held in storage for eight months have developed as high as 95 per cent infestation. Unfortunately the presence of the moth is not of rare occurrence. The insect is generally present and active in situations where food products are prepared, stored or handled in quantities.

Combative Measures

Clean Surroundings. A general cleanup at frequent intervals will do much to keep down serious outbreaks. Frequently the insect breeds in waste material in out of the way corners, basements, etc.

Frequent Stirring. Substances that must be left exposed in open bins or in sacks should be moved frequently. Shoveling from one bin to another or rearranging the sacks occasionally is of value.

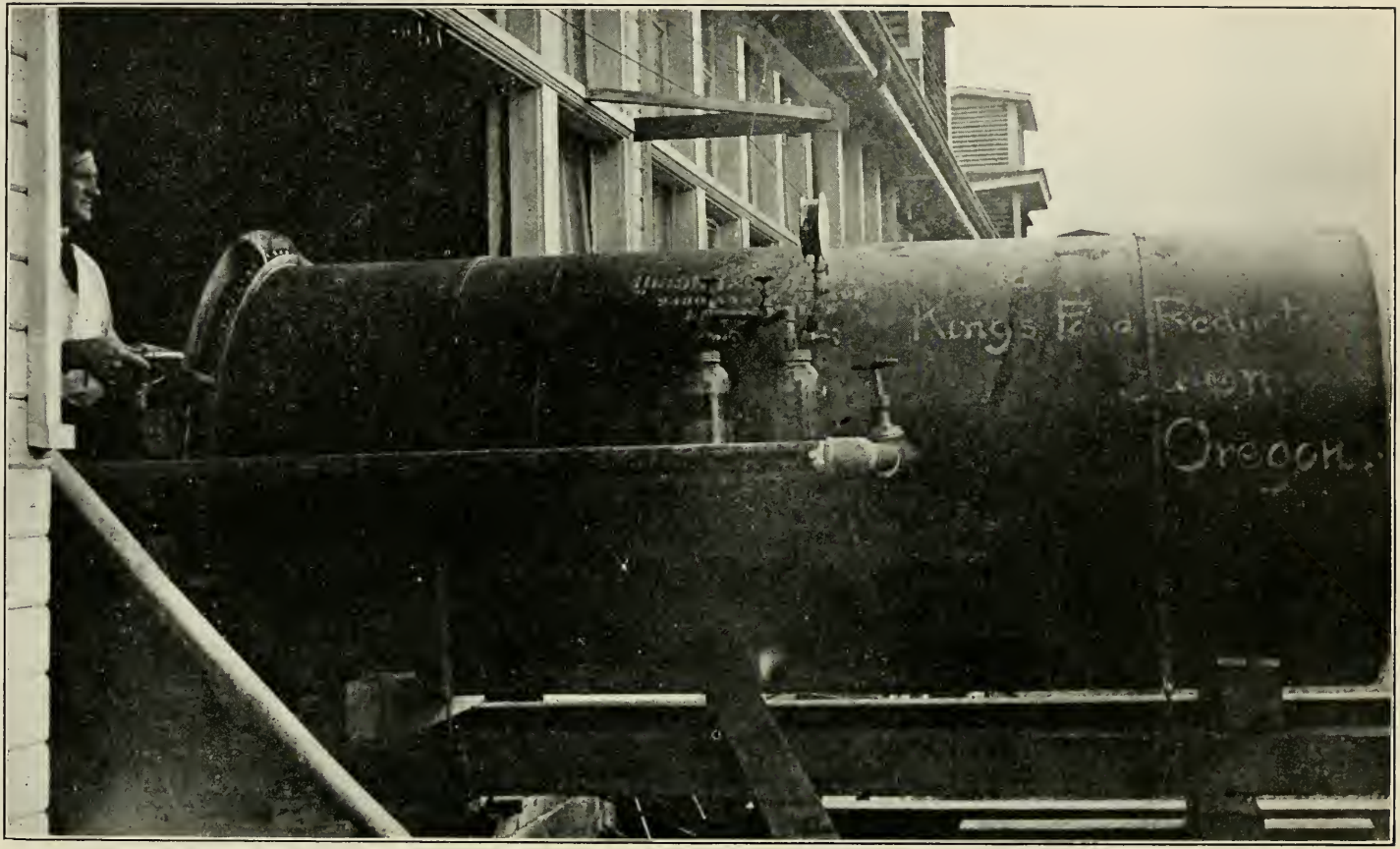


FIG. 3 VACUUM FUMIGATOR, SHOWING GENERAL TYPE OF RETORT INSTALLED RECENTLY BY COMMERCIAL EVAPORATING PLANT IN OREGON (Photo by W. W. Wicks)

Keep Materials Moving. Stock materials in cartons, sacks or containers should not be permitted to remain for indefinite periods in one place. Contamination becomes general, and wholesale destruction soon follows.

Insect Proof Packages should be the aim. A product in cartons with an inner sealed container of waxed paper, if free from infestation when packed, is seldom infested.

Reprocessing. Materials such as prunes which are reprocessed at the time of packing, or any substance which can be subjected to heat (see below) for a brief period will be free from active infestation when packed, and if in an insect proof package or kept moving, should remain free of contamination. Often we have observed a product, treated to free it of infestation, then packed for shipment and stored for several days adjacent to bins of infested material. In such an event, eggs will be liberally deposited on the package and where cracks or tears permit entrance of the larvae, the infestation of the material is only a matter of time.

Heat. A temperature of 125 to 130 degrees Fahrenheit will kill all stages of stored product pests, where they are exposed to this temperature for one hour. Small packages of infested material may be readily treated in a moderate oven. For certain commercial products it would appear reasonable that heat could be utilized as the medium of control, as is done for many of the large mills in the Middle West.

Fumigation

Gas fumigation must still be the most general practice for the control of insect pests of stored food products. The presence and possibilities of these pests are so widespread it would appear advisable in contemplating the erection of warehouses, packing plants, etc., to consider gas-proof construction. At present in Oregon it is the exception to find a building of this nature sufficiently well constructed as to permit of effective gas fumigation.

Carbon Bisulfide

Carbon bisulfide is the most practical fumigant for the treatment of moderate quantities of material. It can be used for the treatment of seeds intended for planting, and foodstuffs are in no way injured when the gas is properly applied.

This material is inflammable, and some insurance companies may not insure against fire where carbon bisulfide is being used for fumigation.

Application. See that the room or containers are tight enough to hold the gas. The liquid carbon bisulfide may be obtained from any druggist, and six pounds should be procured for every 1,000 cubic feet of space to be treated.* If the temperature is low or if the gas can leak from the bin, a larger amount will be necessary. Do not attempt to fumigate if the temperature is below 60 degrees Fahrenheit. The gas is ineffective below this temperature.

Carbon bisulfide is heavier than air and tends to settle. The liquid should be placed in shallow pans on top of the material to be fumigated. Where considerable surface is exposed it is well to divide the liquid and place in pans at several points, so as to obtain a more even distribution of the gas. As soon as the liquid has been placed in position, immediately close the container. Allow the gas to act for from 24 to 36 hours. The bins or containers may then be opened and allowed to air out.

Caution. Carbon bisulfide is very inflammable in both the liquid and gaseous forms. Keep all lights, sparks or flames away from it. Do not use in a heated room.

*For smaller amounts of material the liquid should be used at the rate of two ounces (about four tablespoonsful) for each bushel capacity of the containers.

FIG. 4. EVAPORATED PRODUCT IN CARTONS, READY FOR THE TRADE, BEING PLACED IN VACUUM FUMIGATOR FOR TREATMENT (Photo by W. W. Wicks)

Sulfur Fumes for Empty Warehouses

Sulfur fumes may be used in some cases in place of carbon bisulfide. Empty bins, storage rooms, etc., may be treated with sulfur fumes where it is desired to clean up an infestation before storing fresh products.

The stick or flour sulfur should be procured at the rate of four pounds to each 1,000 cubic feet of space to be fumigated. The sulfur should be placed in a metal pan raised from the floor on bricks. A small amount of kerosene oil is then poured over the sulfur, and this set on fire. Close the room tightly and keep closed for 24 to 36 hours.

These fumes are injurious to food products, grain, flour, etc.

Caution. It is necessary to guard against fire in the use of this treatment.

Vacuum Fumigation

Just recently there has been developed in California* the vacuum fumigation process for stored product pests. The development of this process to the stage of practical installation of vacuum fumigators is already an accomplished fact and marks a most important epoch and one of far-reaching importance in our advance in effective control of stored product insect pests.

Briefly the general process consists of the installation of a large retort connected with a vacuum pump. The materials to be fumigated, already packed in the ultimate container, are placed in the retort, the air removed until a 26 to 29 inch mercurial vacuum is secured; the gas, carbon bisulfide, is then passed into the retort and allowed to remain for one hour. The gas is then pumped out and air pumped through the retort until the substance is cleansed of all gas fumes.

The greater penetration of the gas and its increased toxicity for the insects as a result of the employment of the vacuum process is evidenced in that 100 per cent of all stages of stored insects—eggs, larvae, pupae and adults—are killed in the brief period of one hour. Ordinary atmospheric fumigation with carbon bisulfide requires from 24 to 36 hours and, except under the most favorable conditions, can not be expected to give 100 per cent mortality.

It is not the purpose of this paper to enter into a lengthy discussion of the process, cost, etc., of vacuum fumigation. A large commercial evaporated products concern, with plants located at Salem and The Dalles, have vacuum fumigators installed. As with numerous commercial concerns in California where this system has been installed, reports of the results of its use are highly gratifying. Commercial concerns in general faced with this problem of infestation by stored products pests will do well to look into the merits of the system. That this process will prove itself of such general practical worth that many additional retorts will be installed is the prophecy of the writer.

OREGON PEARS CHOICE QUALITY

Good Soil and Climatic Conditions Make State Ideal for Culture of This Fruit

By A. C. Allen

Pear growing in Oregon is rapidly developing and with the impetus given the industry this season by the good markets, pear growers will look to the future with optimism.

That Oregon does produce pears of exceptional quality is an acknowledged fact, and certain sections of the state raise a quality of pear which is unexcelled anywhere in the world. Some people imagine that a pear is a pear no matter where it is grown, but it is only necessary to compare a Bartlett, Comice, Bosc or

*1920. D. B. Mackie. The Application of Vacuum Fumigation to Fresh and Packed Dates. Cal. State Bd. Agr. Mo. Vol. — No. — p. —

any other pear raised in these few favored districts of Oregon, with one of the same variety raised elsewhere, and the difference is plainly marked. Not only does the fruit keep better, but its distinctive flavor—delicious, melting and fragrant—brands it as supreme.

To raise good pears it is not only necessary to have good soil, but the climatic conditions, soil makeup and natural conditions must be just right. After this, careful selection of stock and varieties, careful and scientific cultural methods and proper harvesting and packing must be followed in order to produce the perfect article.

Good pears are raised in several sections of the state, but outside of a few raised in the Willamette Valley and Hood River district there are few commercial pear orchards outside of Southern Oregon. It is this latter section which is, today, the preeminent pear raising district of the State.

The pear acreage in the United States is gradually decreasing. But few sections in the East are now producing commercially and those that are, are either dwindling or barely holding their own against the ravages of disease.

California has produced enormous crops of Bartletts for the canneries, but it now looks as though the future great pear canning center will be Southern Oregon. This can be readily seen when one understands the conditions confronting California growers. Heretofore, the canneries started the season with peaches and canned that variety of fruit as long as they could get the proper kinds. When the peaches were gone, which was about the time of the Bartlett season, they turned their attention to pears. Now, however, they have succeeded in developing new varieties of canning peaches which ripen in rotation so as to give the canneries a steady run of the fruit throughout the whole season.

As the peaches may be canned much easier, cheaper and with more profit than pears, the canneries are turning their attention more and more to them. The result is that many growers are now going into the raising of peaches instead of pears, and the acreage of the latter will undoubtedly grow less.

But canned pears are a necessity and, therefore, the canneries will look to Oregon for the pears. Besides, it is admitted that the Oregon Bartlett makes a better canning pear than the California product.

With proper organization among the growers and the right kind of packing, advertising and selling, it won't be long before the public will be demanding Oregon pears in preference to all others.

APPLE INDUSTRY

By H. H. Weatherspoon, State Horticultural Commissioner for the Fifth District

A careful survey of the apple industry, as well as other fruits now grown in the state during the past 20 years, furnishes some very interesting facts and aside from this, serves as a guide, if well studied, to the future orchardist going into fruit growing as an occupation.

About 20 years ago it may be said that Oregon as a state entered the field to produce apples, pears, peaches, prunes and berries in a commercial way to help feed the outside world in competition with other fruit-growing states that had been producing for nearly 100 years.

How well Oregon has forged to the front may be easily learned by asking nonresidents of the state or residents of foreign countries who have used and handled Oregon fruit what they think of it. The reply is always the same: There is none better and very little quite so good.

What we think of our fruit at home stimulates us to keep trying to reach a still higher mark in quality, and what the outside world thinks of our fruit brings the demand and highest prices obtained by any fruit-growing section of the entire world.

It is indeed marvelous when we think of the thousands of cars of fruit raised and shipped from the State annually that a very small portion of it reaches even the small cities and practically none at all reaches the small towns, owing to the fact that the larger cities are willing to pay the very highest price for the best article, thereby drawing so heavily on the Oregon product that practically the entire production is consumed exclusively in the larger cities.

The definition to the great success attained may be easily written in two words, "Appearance" and "Quality."

The pioneers in this business deserve great credit for the system and thoroughness brought about in their early organizations for a systematic growing of fruits rather than a helter-skelter, go-as-you-please system which other states had permitted.

It can be said without successful contradiction that Hood River set the pace for the world in berries and apples, Willamette Valley in prunes and the Rogue River country in pears.

New ideas, clean fruit, graded fruit, neat packages and many other things not thought of before Oregon entered the field have been brought about through the tireless efforts of our pioneer orchardists, and the same tireless efforts are going on today even in a more scientific way, as we now have more and better data to work from.

The state has benefited more through the famous Hood River strawberries, Oregon box apples and Oregon prunes traveling around the United States and European countries than through any known method of advertising otherwise, as it is a well-known fact that what suits the taste is rarely forgotten.

In the early efforts of horticulture the entire citizenship, it seems, absorbed the right spirit and encouraged the business, by providing public money for a state horticultural society, a state horticultural board, as well as to provide money for carrying on a complete horticultural department in our agricultural college, where the business is taught and studied from every scientific side known up to the present time.

There is no college in the United States or the world that is giving more assistance in this direction than our State Agricultural College.

Bulletins on any phase of the subject may be had for the asking; letters on any subject are promptly and intelligently answered; special short courses are given free each year; demonstrators are sent out from time to time and traveling schools are part of the work they are carrying on.

The biennial crop and pest report is one of the most complete of its kind ever gotten out by any institution, making as it does every person carefully studying the same complete master of the pest situation, when instructions are carefully carried out.

All of these things Oregon has done to assist and bring about this first place world recognition as a fruit-growing state, and while the past 20 years have brought us forward in leaps and bounds, it must be remembered that if our development was 1,000 times greater than at present we would not have touched the maximum possibilities of production in fruits.

Not unlike most other business, fruit growing has its up and down periods, seemingly about every 20 years, the first half of these periods taking on a great boom, the second half great declines.

Future Is Bright

We are just entering, apparently, a new 20-year lease on one of those periods which looks bright for all, and it is to be hoped that our development will go on in a sane and safe way rather than be carried on with a boom, as was the case 10 to 20 years ago.

During the past 20 years there was only one year where there was a real cause for depression in the markets on account of overproduction—the year 1915.

But the tremendous settling of very large tracts by large corporations carried on in the Northwest created suspicion that we were to be continually doomed to an overproduction. It seems that buyers, dealers, as well as consumers, had completely lost their better judgment and had forgotten that Mr. Stark, one of the late day pioneer nurserymen, had often said that only 10 per cent of all fruits planted ever became a commercial quantity.

Twelve years ago a representative of one of the large railroads called on the writer for inside information as to the probable output of the orchards covering a period annually from 1914 to the year 1920 in his locality.

This was with a view to increasing the carrying refrigerator capacity service to meet the seemingly increased demands.

He willingly showed his figures, which were about closed up and which showed the total number of acres, each acre to bear a certain amount, the total of which was for Idaho, Oregon and Washington, to be 220,000 carloads for the year 1920, while as a matter of fact, if the three states raise 25,000 carloads in 1920 it will be a bumper crop. It was such estimates as made by this representative that excited the entire country and caused depressions each year at market time.

During the past five years there has been neglect and slaughter of orchards in the United States, until we are lower in acreage per capita than any time for 75 years.

Twice in the history of the United States we have produced about 85,000,000 barrels, or 255,000,000 boxes.

Prior to the European war our export business was 11,000,000 barrels greater in apples than the entire crop in the United States this year.

Prior to the year 1910 that portion of the United States lying between the Rocky Mountains and the Alleghany Mountains produced about 50 per cent of what they consumed. The same territory during the past five years has produced only about 15 per cent of their consumption of apples, with a still lower decline to follow.

All the commercial orchards along the Kansas side of the Missouri River have disappeared. Nebraska has lost her commercial orchards, likewise Iowa. Missouri, with her once-famous Ben Davis orchards down in the Ozarks, ceases to be even a remote quantity for her own consumption.

Box Apple Best

Naturally we ask, Why all this? It has been brought about by the Northwestern box apple fighting its way, year after year, into their most valuable markets, taking the cream of the markets, causing the home product to go begging.

The farmers of those states, as well as Illinois, Indiana and Ohio, have grown tired of taking their apples to town in sacks or in bulk to receive offers of from 25 to 75 cents per bushel, while at the same time they see the Western box apple perched high up in the show windows, tagged and selling at $4 per box.

Under such conditions is it to be wondered at that state after state has given up hope and gone out of the business, until New York and the Virginias are all that is left of the real commercial districts between the Rocky Mountains and the Atlantic.

To accomplish so much in so short a time it has taken effort with a very fine system behind it, yet we have not reached the limit that will be reached, and the writer fully believes that 10 or 20 years hence the Oregon apple will be looked upon as the greatest fruit producer of the modern age, grown in a climate where rain and sunshine meets, especially created for that purpose.

The pioneer stage of the game is now past; we are face to face with figures, facts and results, which tell us we are headed in the right direction, and the man now having an orchard of any value who neglects or pulls it out will see his mistake by watching the man that holds on and does his work systematically.

Not all of Oregon lands are good fruit lands, but each county in the State, without exception, has great acreages of valuable fruit lands, a great acreage of which is still in timber or land that has been logged off and is ready for clearing. Some tracts are large, but thousands are small—just the right size tracts to make good farms, with 5, 10 or 20 acres of orchard with enough land to diversify in other lines until the orchard may bear in a paying way.

It is the small orchard we want, rather than the large ones, as individual ownership insures attention and production, while most large tracts are set and financed by boomers who have no knowledge of real orchard lands and care nothings more than getting the unsuspecting purchaser's money and leaving him up against a probable hard game as quick as he can.

There is not another state today offering the inducements to prospective settlers who desire to get into horticultural work as Oregon.

Climatic conditions insure success, systematic organization insures protection to the business, scientific knowledge and research insures good advice to be had for the asking, and complete market organizations insure fair deals in markets, while quality insures the highest market price.

The State contains thousands of acres of both irrigated and nonirrigated lands that will produce the very finest quality fruits and, best of all, most of these lands can be had cheaply.

APPLE TREE ANTHRACNOSE

By H. P. Barss, Plant Pathologist, Oregon Experiment Station

Apple tree anthracnose is the most serious canker disease of Western Oregon. It has caused premature destruction of many promising orchards and undoubtedly will result in large losses in the future unless growers are prepared to adopt the methods required to combat it. The disease can be held in control by spraying methods, but there is only one season when spraying can accomplish the desired results and that is in the fall. Bordeaux mixture is the best material to use for the purpose, according to the experience of the growers, as it seems to retain its effectiveness for a long time, regardless of rains and cool temperatures. The usual time of application, where but one spraying is given, is immediately after the crop is harvested. Earlier applications would be preferable from the standpoint of disease control, but the grower naturally objects to covering his fruit with a heavy coating of spray just before picking, and hence postpones the work. Furthermore, the spray has a tendency in some seasons, when abundant rains occur in early autumn to induce a reddish speckling, particularly noticeable on yellow varieties like the Newtown, resembling the blush around San Jose scale spots or the spotting so often observed on fruit allowed to hang long on the tree after picking time.

Dean A. B. Cordley, of the Oregon Agricultural College, was the first person to give this disease a thorough study and to determine its cause and methods of control. The disease is due to a fungus. It starts from a microscopic spore which, alighting on the bark or on the fruit in the fall rains, germinates and bores its way under the skin and into the substance beneath. The spores come from the old cankers of previous seasons and from this source only. A single canker may produce countless numbers of these minute spores. They may be blown about by the air currents from one orchard to another or from tree to tree. They are washed by the rains or spattered about by the splashing drops or carried on the feet of insects from one part of the tree to another. When once a spore has succeeded in getting into the bark, a canker is started and no spray applied to the outside can stop its progress. The whole idea of spraying, then, is to cover the entire bark of the tree with a material poisonous to the spores so that

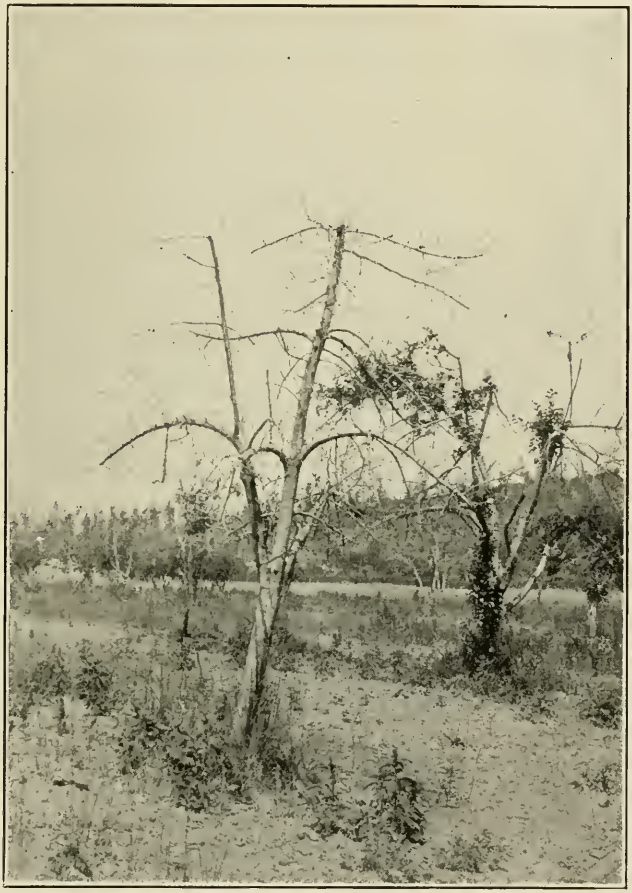
APPLE TREE ANTHRACNOSE CANKER—SEVERE DAMAGE, RESULT FROM THE GIRDLING OF LARGE LIMBS BY CONFLUENT CANKER.

all spores alighting on the bark will be killed before they get in. It is evident that the more thorough the spraying, the more perfectly the bark is covered, the nearer the grower will get 100 per cent protection.

It is an interesting fact that while the tree is actively growing, the anthracnose fungus can not get a start in the bark. As soon, however, as the tree goes into dormancy at the close of the season and active growth ceases, it can no longer resist the invasion of the fungus. That is why it is not necessary to protect the tree against disease in the summer, even though spores may be formed at that time. Just as soon as the fall comes, however, and rainy weather with it, conditions are ideal for infections. All through the fall and into the winter, infections may occur actively and it is against this infection period that the trees must be protected. To insure complete protection, a spray ought to be applied before the fall rains begin and then again after harvesting to renew the coating and insure continued protection through the rest of the winter. As stated previously, growers object to the early spray on bearing trees and are apt to content themselves with the less perfect protection which the later spray affords. As a result, anthracnose is seldom reduced to a minimum, although in ordinary seasons a reasonable degree of control is secured from the late spray. Growers must realize, nevertheless, that preharvest rains in unprotected orchards will mean a certain amount of infection and after a fall season like that of 1920, there should be no surprise if a considerable amount of infection develops where only an after-harvest spray is given. The Experiment Station is working on the problem of getting a more satisfactory method of early protection than we now have, but none of the half dozen different materials and formulas tried thus far appear to have any great advantage over a weak Bordeaux, and this spray admittedly has its drawbacks. The spray following harvest should be with the full strength formula 6-6-50 Bordeaux.

After the infection has taken place, it is some time before it becomes evident to the naked eye. Then it shows up in December or January as a small, round,

dark spot in the bark, which enlarges through the winter until by early spring it reaches a maximum size of perhaps two to six or eight inches in length and attains an elongated shape. As soon as the tree becomes active in the spring, the canker is checked in its further growth and a crack appears around the margin. The healthy bark around it grows and the canker commences to dry out, being left as a sunken dead strip of bark. The damage caused by a single canker on a branch seldom amounts to much, although sometimes small twigs may be



AN ANTHRACNOSE RUINED ORCHARD

girdled and killed. The infections, however, often occur in great numbers and close together, so that the cankers unite and thus bring about the death of great stretches of bark, which may completely girdle large limbs or even the trunks of young trees, with the result that the parts beyond eventually die and the tree is seriously crippled.

As the season goes on, the dead canker bark shows little raised pimples which break open by tiny cracks at the top. These are the spore cushions, from each of which a crop of spores is produced. It is the part of wisdom to remove as much of this dead canker bark as possible from the orchard before the fall, so as to get

rid of this infective, spore-producing material as far as practically possible, and the prunings should be burned, as the cankers will continue to produce spores even after removal from the tree. One unfortunate fact was discovered by Professor H. S. Jackson, formerly plant pathologist at Corvallis, and that is that the cankers will keep on producing spores for two or three successive seasons, and it is probably true that spraying the cankers with Bordeaux will not altogether stop this. Various materials are being tested in an effort to find something that will prevent the cankers from sporulating, and there is good reason to believe that this search will not be in vain, but even if a material is discovered which will do this it will hardly be possible for the orchardist to find and destroy all the cankers in his orchard, and there will still be breezes blowing in spores from the outside. We must still expect to have to spray to keep ahead of the disease.

In rainy falls, damage will result from fruit infections where there is much anthracnose in the orchard, and that is another reason for keeping the trouble well under control. The infections will not show up very much, if at all, at picking time, for they have only started, but they will show up in storage as time goes on, so that sometimes what appeared a pack of perfect fruit at harvest time will be practically worthless by February or March, to the great disadvantage of the grower and to the Oregon trade. Oregon can not afford to let the disease continue its raids in our orchards. It can be kept down. So let us spray and spray right.

DEVELOPING A WALNUT GROVE

By Charles Trunk, Dundee, Oregon

This paper is not intended for those that have already planted walnut trees, but for those that have it in their mind to plant a walnut grove, this, or in coming years.

You naturally will ask, "Is it worth while to plant a walnut grove in Oregon? Is it a wise move to buy a walnut grove, or buy the land and plant the trees, taking chances of getting returns in later years?" To answer these questions I will give you the history of our own walnut grove; then you can make your own conclusions whether you would become a walnut grower or not.

I would like to state here, that, as the saying goes, I have no ax to grind; I have no walnut land to sell, nor am I engaged in the nursery business. I consider it a very serious task to give you the facts abount walnut growing, so that you will understand them. At my home place on the road between Dundee and Dayton, about ten acres of my land is adapted to the growing of walnuts; the rest is not, because it lies from twenty-five to fifty feet too low. The trees on the land of the lower elevation grew well, but nevertheless the crop is not sure. Every year there is a certain amount of danger of having the nuts frosted, either in the spring or in the fall, whereas on our higher land, we never had any damage by frost, thereby being certain of a full crop of nuts every year.

As a good many of you know, one of the oldest and largest walnut groves in the state is at Dundee, planted by Thomas Prince. As I had land and soil similar to the Prince place, I concluded to plant ten acres myself. This was in 1906, when walnut growing was still an experiment in this State. Many started to plant when I made my first planting. Some got discouraged the first and second years they had planted, and the rest fell by the wayside the following years. Today there are about a dozen of the old faithful growers left, and I respect these men who had the staying quality to wait and see what a nut tree would really do in this State, and we did prove that in this valley walnuts can be grown on a paying basis, and that they are better flavored and better filled than anywhere on the face of the earth. In 1908, 1909 and 1910, we added to our grove. Today we have forty-six acres at various ages and we intend to plant twelve acres more the coming winter. This will show you that I have faith in this industry.

I spent fourteen years of my life in developing a walnut grove and the returns we have received from our grove justifies us to plant another one. There were years when the enthusiastic walnut grower of this State was considered a lunatic, fit for the asylum. I had people in our orchard who told me they would not waste good land on nut trees. They were only divided on different methods of removing them, grubbing them out by hand, or making quicker work by blowing them out with dynamite. Well, I did not take their advice. Last year we took from twenty-six acres of nut trees that are at an average age of eleven years, $4,200 worth of nuts, which is 16½ per cent on land valued at $1,000 per acre. Less than $700 covered all expenses of cultivation, harvesting and drying. On account of lower prices this year, our income will not be quite as great, or about 12½ per cent on $1,000 valuation. Please bear in mind that these trees are still very young.

The life of a prune tree is about thirty-five years, that of a walnut about 250 years. So when a nut tree is fifty years old it is still in its childhood days.

In planting a walnut grove, the location of the same governs the failure or the success of the grove to a great extent. Unfortunately, there are nut trees planted on too low an elevation, and the very severe winter last year injured and ruined a good many promising groves.

This mistake need not be made any more. There are thousands of acres of land in this valley, as good as mine, where walnut trees may be successfully grown and where crops are a certainty every year. We proved this in our own grove. There is not another crop grown in this valley that pays better than walnuts, provided, as I said before, that the location is right.

This is proven by all the walnut groves in my neighborhood. We are past the stage at Dundee where we estimate the quantity of our crop, not by pounds, but by tons.

Our district had the heaviest crop of nuts that it ever had. It seems to me that the heavy freeze we had last winter was rather a benefit to the trees than an injury. Another important fact is the variety of trees to plant. There were some mistakes made in this respect, but as time went on, we found that Franquettes, Mayettes and Parisienes give the best results in our own grove, giving the Franquettes the preference over the others, being a heavier bearer and giving more assurance of a crop every year. One of our fourteen year old Franquette trees had this year five two-bushel sacks of nuts and another four and a half sacks, being seedling trees.

Another thing we have never neglected was good cultivation. The more thoroughly they are cultivated, the more quickly the trees will bring an income. They must not be neglected for eight years, and if good cultivation is given after this, they will pay in larger crops and higher-grade nuts. I am sometimes asked at what age a walnut tree will pay on a commercial basis, that means making money. My answer is about ten or twelve years of age. We may have some nuts on seven or eight year old trees, and they may pay in nine years of age for their cultivation, taxes and upkeep, but to make money off trees of this age can not be done.

After your trees have the age of ten or eleven years, and provided they were well taken care of, you have the best investment that this State offers.

Planting a walnut grove is like taking out a life insurance policy, with this difference: That if you have a twenty-year policy, you pay a certain amount every year for twenty years. If you plant a walnut grove, you pay a certain amount in cultivation, work and capital invested for ten or eleven years. After this, your trees will pay your yearly dues. In twenty years you will have a piece of property that is worth from $1,000 to $1,500 per acre. There is no surer investment, provided the trees have the best of care. I know that ten or twelve years is a long time to wait, and this is one of the reasons why this line of horticulture is not further advanced in this State. But if we consider the long life of

FORTY ACRE WALNUT GROVE, EIGHT YEARS OLD—CHARLES TRUNK, DUNDEE

the tree, it is a short time, after all. If only the people of this state would realize the opportunities of making money by the growing of walnuts, our hillsides would be one continuous walnut grove. As sure as we are gathered here today, the growing of walnuts will be one of the greatest assets that this State has.

Nature provides everything needed for the growing of walnuts. All we have to do is to take hold. If you plant when you are young, you, yourself, will reap the benefit and reward. If you are old, your children will. If you intend to plant, put your whole heart and soul into this work and you will succeed. The path is broken for you, and the mistakes you can make are few, and in time you will help to place on every table in this great Nation the matchless Oregon-grown walnut.

CHESTNUTS

By Knight Pearcy

The chestnut, at the present time, is of minor importance as a commercial product in the Northwest. There are but very few commercial plantings and these are small in extent. The behavior of the trees in these few small plantings, together with the performances of the many trees planted all over this section as shade and ornamental trees, have demonstrated that our climatic conditions are suitable for chestnut culture. An analysis of conditions in the eastern chestnut growing regions should be made before we decide whether we are warranted in making considerable plantings here.

Twenty years ago great chestnut forests were growing in the eastern part of this country. Today these forests are disappearing, apparently to extinction, and that quickly, too. In 1904 it was first noticed that many trees in the vicinity of New York City were dying of some strange disease. Investigation by pathologists demonstrated that the disease was caused by a fungus, Endothia parasitica, by name.

It spread rapidly through the native chestnut area, and by 1916, was found in thirteen states and had caused damage estimated at $50,000,000—half the total valuation of American chestnut forests. At the rate that it is eating into the forests the American chestnut will soon be wiped out of its native home.

With most diseases of this nature there always appear some immune trees in the forests or orchards, from which may be bred resistant strains of trees, but no American sweet chestnut tree has yet been found that shows any degree of resistance.

It has been discovered that this fungus has its home in China, Japan and Korea, and that it was evidently transported to America on imported nursery stock. The fungus spreads by means of birds, insects, wind, rain and by shipment of nursery stock, chestnuts and chestnut timber, on which the bark is permitted to remain. It causes death by penetrating the bark and attacking the cambium and sap wood areas.

This disease is deadly, both to American and European varieties. It is spreading rapidly, 99 per cent of the trees in Eastern Pennsylvania having already been killed, according to reports.

None of our American and European varieties is immune, although certain nurseries have claimed the Paragon to be so. The disease is practically uncontrolable, although where one has but a few trees he can keep it in check by cutting.

An embargo is needed to protect the uninfected Western districts. The disease cannot be detected on nursery trees. We should not import chestnut trees of any kind from any of the blight districts of the East, which means from any of the native chestnut area.

The Japanese and the Chinese chestnut species are attacked by this fungus, but the injury seems to be comparatively light, since these species, in their age-

long struggle with the blight, have developed resistant strains. The hope of the Eastern United States to remain a chestnut producing section seems to be in discovering some Japanese or Chinese variety, or a hybrid, that is blight-proof and which, at the same time, has other qualities which are desirable. Dr. Van Fleet of the government Department of Agriculture has developed a number of hybrids between the Japanese chestnut and our native Chinquapin which hold considerable promise to the Eastern growers.

The chestnuts of the world are of several species. The American chestnut, known to botanists as Castanea Dentata, is a tall straight tree, when grown in forests, and produces nuts of the highest quality, although smaller than those of most of their species. There are comparatively few named varieties of this species, the Rochester being perhaps the leading variety.

The European species is known to science as C. Sativa. Its tree is smaller than that of the American species, but its nuts are larger, although of poorer quality. Its blight resistance is greater than that of the native chestnut, but not enough to permit it to survive when planted in diseased sections. There are many named varieties of this species, although most of these are varieties that originated in this country from seedlings of this European species.

Named varieties imported directly from Europe have not succeeded as well in the Eastern United States as have the varieties originating on this side of the water, although it is claimed that many of these named French varieties, when grown on the Pacific Coast, do exceptionally well. This we would expect in keeping with the well-known horticultural law that plants imported from the Asiatic Coast countries do better in Eastern America than on the Pacific Coast, while plants from Western Europe succeed better out here than in Eastern America. Numbo and Paragon are two of the most popular named varieties of European chestnuts growing in the East.

The Japanese chestnut, C. Crenata, is highly resistant to blight, has a very large nut, although its quality is so low that it usually has to be cooked to be palatable, is precocious, prolific bearer, and produces an earlier maturing nut than does either of the above named species. The tree itself is semi-dwarfed. It seems to have everything but quality of nut to make it a desirable nut producing species, and plant breeders feel that they can improve the quality of the nut and are now working upon this problem. Alpha, Beta, Parry, Coe, Boone and Giant are varieties of this species.

The Chinese chestnut, C. Molissima, is a relative stranger in this country, and we know less about it than the others. It makes a taller tree than the Japanese and produces nuts of good quality.

We have not experimented with the chestnut enough in the Northwest to be able to say just what soils are best, but it appears to do well on most of our fruit soils, where drainage is good.

Forty to forty-five feet spacing seems to be about the need of the American and European varieties, while the Japanese tree will do with a thirty foot spacing. General culture is about that of the apple orchard. Little is known regarding pollenization, but the general advice is to plant several varieties, when growing the European varieties. The Japanese varieties are apparently self-fertile.

One grower in the Middle West reports the following yields from a Boone seedling tree: Eight pounds the sixth year; 26 pounds the ninth year; 50 pounds the twelfth year; 80 pounds the fifteenth year, and 140 pounds the seventeenth year. He received 25 to 40 cents per pound in the Chicago market that year.

One grower near Salem with twenty crowded trees, all seedlings, harvested an average of 50 pounds per tree from trees in their twenties. One tree yielded 100 pounds. We have record of other Oregon trees that have borne as high as 150 pounds of nuts, and of a number that have averaged 50 pounds per tree for years, which would give 1,200 to 1,500 pounds per acre.

Most of our nuts are high in fat content and fairly high in protein content. The chestnut, however, is low in fat, but very high in carbohydrates. Its composition and food value is very close, when analyzed, to that of cornmeal or of wheat bread. Many of the Europeans use it much as we use the potato, to supply the starches in their diets. They use this nut boiled, roasted, made into cakes, and in many other forms. It enters into their diet very extensively. They also use it for feeding hogs, as do the Japanese. It has a high feeding value and, acre for acre, will produce more fattening value for hogs than will a 25-bushel meal of wheat. A few chestnut trees planted on waste land would, in a few years, serve to fatten the hogs for the winter's supply of pork for a farmer, thus releasing more valuable land now used for raising hog feed.

As to the future of the chestnut in America: The native forests of the East are doomed. Any chestnut industry that may be maintained in the present American chestnut region will have to be based on resistant hybrids that are now being tried out. Parts of the Middle West are planting a few chestnut orchards, and these sections may develop plantings to supply the markets of the East, in case they can keep the blight out. The Pacific Coast is the only remaining section that may step into the breach. This section has the climatic condition necessary to success and is fortunate in not having any native chestnut forests, hence will have less trouble with diseases and insects than will an old growing region. We know we can grow the nuts commercially. Our question is simply this: Is the Eastern market attractive enough to warrant our growers, who can do so well with filberts and walnuts and with so many fruits and berries, to plant chestnuts instead of other nuts and fruits?

Mr. Henry E. Dosch, who introduced the French walnuts into Oregon, says that he also experimented with other nut varieties. In chestnuts, he imported from France the Combale, Nnouzillarde, Merle and Lyon, very vigorous growers, reaching a height of fifty feet, which, however, are shy bearers of nuts; has also the Italian and Spanish, and finds the Spanish best adopted to our soil and climatic conditions, bearing full crops of very sweet nuts every year. Mr Gray prefers the American Sweet, also a good producer, and says they bring the highest price in the market.

PLANTING A FILBERT GROVE

By Ben Dorris

Some people plant an orchard for the sport of the thing, others in order to supply suffering humanity with the necessities of life, to hear them tell it, but I am going to address myself to those who intend to plant with the idea of making money.

Climate and Soil

The first requisite in planting an orchard is the site. Climate is a secondary consideration in this country, as the filbert does well all over the Pacific Northwest and, in fact, over the northern half of the United States. It is not the climate that prohibits the growing of the filbert in the Middle West and East, but the presence of the American hazel, a host plant for the filbert blight. Wherever the native hazel grows, the climate is favorable for the filbert.

The soil should be of good quality; that is, fairly rich and well drained, with the ability to hold moisture through the summer. It is probable the filbert will do as well, if not better, on comparatively poor soil as any orchard tree, provided it is not wet land, but it would seem to me that any one contemplating the purchase of land for the purpose of establishing a filbert grove had better secure a fair grade of land, as the cost of procuring and setting out the trees is too much to risk to save a few dollars an acre on land. If the wild hazel grows, or has

FILBERT GROVE, 11 YEARS OLD—PERCY GIESE, GRESHAM, OREGON

grown luxuriantly on the site in question, you could not ask a better recommendation as to soil, climate or elevation. As to rich soil producing too much wood growth, I believe that, with the proper pruning to force out fruiting laterals, there cannot be too much wood growth.

As to elevation, again the best test is the presence of the hazel. If the hazel will mature any nuts in the locality in question, it is not too high for the filbert. And the filbert has one great advantage, along with the walnut, for mountainous and inaccessible localities where transportation is intermittent, in that it is not a perishable crop but can be stored for months without injury, as well as being a concentrated crop, of high value per pound, thus being able to stand the cost of expensive hauls to the railhead.

Varieties

The choice of varieties is next in importance. Due to the fact that the filbert is not self-fertile, two elements demand consideration, one of yield, the other of pollenation, which will be considered more in detail under that head.

There is no question whatever that at this time the Barcelona is the only nut for the main planting, from a commercial standpoint. I believe everyone will agree with me when I say that a commercial planting is for results in dollars and cents only, and the aesthetics have little place therein. The Barcelona is a true commercial nut to begin with, of good size and readily saleable; it has a very short husk which opens as it matures and permits the nut to fall to the ground, while the husk remains on the tree for some time in most cases. Those good nuts which mature late and to which the husk still clings can be easily freed of the husk by drying for a few days and beating. It is the heaviest yielder of all the filberts so far introduced into this country. And it is free from the attacks of the bud mite, the only insect pest which bothers the filberts.

The DuChilly is a fine nut, but it has the disadvantages of being an irregular yielder, has a long husk which must be removed after the nuts are gathered, and is subject to the bud mite, any one of which is enough to condemn it for the main planting. But it is very valuable as a pollenizer for the Barcelona, and for that reason should have a place in every commercial planting.

The Daviana is a very fine nut but is an extremely light yielder at present and has the other disadvantages of the DuChilly. It is a vigorous grower and makes a big tree. It is valuable at present, from a commercial standpoint, only as a pollenizer for the DuChilly.

The White Aveline is a good yielder, considering the size of the tree, which is smaller than the Barcelona and DuChilly, and has some value as a pollenizer for these varieties. But it has an extremely long, clinging husk and until some one invents a machine husker it most decidedly has no place in the commercial planting, other than as a pollenizer. It is also subject to the bud mite.

The Red Aveline is a very weak, scraggly tree, and its principal value is to pollenize the White Aveline. But as this is accomplished by other varieties included, I would omit it entirely from a commercial planting.

There is a number of other varieties which have had no extensive tryout—the Cosford, Grosse Blanche, Chaperon, Clackamas, and others. I am sorry I have no first-hand knowledge of these varieties and can say nothing about them.

Pollenation

Pollenation is undoubtedly one of the most important problems that confront the filbert grower. Up until the past year no intensive work has been done to solve it. However, the Oregon Agricultural College has taken it up and last season hand pollenated about 2,200 blossoms in our groves and intend, during the coming season, to carry on the work in a number of groves. Due to the cold snap last winter just before the blossoming period, which injured the pollen to a con-

siderable degree, Prof. C. E. Schuster, who conducted these experiments, does not wish to release the results, which he regards as inconclusive as yet. However, one item stood out from these results, which was that in no single instance, was any variety tested self-pollenizing.

In a state of nature I have no doubt that there is an occasional instance of self-pollenation, but from a commercial standpoint, the old dollars and cents point of view, it is a myth at present.

Our groves are scattered in small plantings over a couple of hundred acres. The original planting, about 70 trees, contains Barcelonas, DuChillys, Davianas, White Avelines and Red Avelines. The Barcelonas, DuChillys and the Avelines are heavy yielders. The second planting is about a third of a mile distant and almost entirely surrounded by natural woods. It contains about 50 Barcelonas and three or four White Avelines. The trees near the White Avelines produce some nuts, while the more distant trees are very shy bearers, but the best tree doesn't produce a third as many nuts as trees of nearly equal age in the original planting, or the third planting. The third planting consists of about a 60-40 spread of Barcelonas and DuChillys, with an occasional Daviana and one White Aveline. It is several hundred yards away and entirely cut off by woods from any other planting, and the prevailing winds in spring are from it toward the other plantings. It is a good yielder for both Barcelonas and DuChillys. The fourth planting is in an old asparagus bed. It consists principally of Barcelonas, with gaps left for pollenizers when we get far enough ahead on onr orders to permit filling in. There are some DuChillys and a Daviana or two in this grove, and the Barcelonas near these trees produce far more than those farther away. This grove is four years old, and the trees are vigorous in spite of having to fight the asparagus for a living.

All observations of natural pollenation from these groves would seem to prove the DuChilly is a positive pollenizer for the Barcelona, and that the Daviana and White Aveline have some virtue in that regard. But the DuChilly seems far and away the best of the lot and should therefore be selected by the commercial planter for this purpose, in the proportion of about one DuChilly to twelve Barcelonas.

Likewise, the Daviana has been demonstrated to pollenize the DuChilly in a state of nature. Prof. Lewis recommends the Clackamas and the Turkish for this purpose. I know nothing of the Clackamas, myself, and cannot advise you on it, but the Turkish has no other value than as a pollenizer, and if any other variety will do the work, I would use it. Personally, I would advise the Daviana until more results are obtained to demonstrate a better pollenizer for the DuChilly; about two Davianas to the hundred Barcelonas and eight DuChillys.

Planting

Having invested considerable money in land and nursery stock and time in the selection of varieties, it would behoove the planter to see that his trees are properly planted. A large hole should be dug at the site of the future tree, much larger and deeper than the tree requires. A shovelful of manure in the bottom of the hole will more than repay its cost, and then the dirt should be thrown in loosely until the bottom of the hole will hold the tree three to four inches deeper than in the nursery row. Let this hole stand for several weeks before planting, to settle. The filbert is a shallow rooter and setting the trees in the top layer of soil may result in losing a number the first summer, before they become established and the root system developed. The manure in the bottom of the hole will draw the roots deeper.

When the trees are received they should be removed from the bundle and well heeled in. In extremely cold weather a little straw over the tops will prevent injury. At no time should the trees be permitted to dry out. When

ready to plant, distribute the trees to the various holes and heel in temporarily. Now, with a sharp knife, dig out all buds on the trunk below, where the surface of the ground will come, which will reduce the number of suckers materially. Be sure to dig out all of the bud. Do not merely scrape the bark.

Plant not closer than 20 by 20 feet, as it has been demonstrated in every old grove that this is the minimum distance. Our big Barcelonas measure 20 to 24 feet in spread. On the square system, this would give 108 trees to the acre; by the triangular system, 125. If I were planting a new tract, where I did not have to line up to existing groves, I believe I would use this system, as it would increase the yield per acre about 15 per cent, at a less than proportionate first cost per acre, and yet give ample room if proper pruning is done. If it isn't going to be done, the prospective planter had better stay away from all orchards and plant potatoes. The only exception would be where interplanting is contemplated the first few years, and in that case, the square system had better be used.

The first year, in fact, every year, cultivation is very important to conserve the moisture and maintain a dust mulch. Where necessary the first year, hand hoeing should be resorted to. Thereafter, the filbert will stand considerable neglect, but if you want to make money out of your grove, do not omit cultivation as long as it lives; manure or plow in cover crops occasionally, because a filbert tree is very much like a cow which won't give much milk on a diet of salt and water.

As to heading, this is a matter of preference. My uncle likes a low-headed tree, but then he doesn't do the cultivation. I know of no real objection to heading 24 to 30 inches, and it lessens the work of suckering, cultivating, etc., considerably.

Visitors to our groves notice that we have trees with one, two and three trunks. From an aesthetic point of view, a grove of one-trunk trees looks better, particularly in winter when the foliage is off. In our display we have pictures of these trees. It frequently happens that one side of a tree is shy or lopsided, especially when the pruning and training the second year was done before the fire. By permitting a sucker to grow on that side, in time it will fill out the tree and make it round-headed, increasing the bearing surface. I would not grow trees deliberately to two or three trunks, but there is no particular objection, if the trunks are made to grow upright so as to not hinder cultivation. We could cut off the lopsided top and permit a thrifty sucker, with buds on all sides, to grow and make a new top, and with a large root system behind it, it will show a rapid growth. This may not be desirable, however, when the tree is several years old, and some careless cultivator has broken a large limb, thus deforming the tree. One thing, the yield will not be affected much either way.

Suckering

It is the nature of filberts to throw suckers. If these suckers are permitted to grow unchecked they will take all the vitality of the tree, the growth of the top will practically cease and, instead of nuts, the tree will be devoted to producing suckers. Some of these suckers attain a length of ten feet and more in a single season. If we do not sucker our grove soon ceases to provide a tin lizzie and the necessary gas, and becomes a source of expense. And to remove them after they have matured does no good. They should be removed shortly after they appear, say in May, while the growth is succulent. Dig the dirt away until the roots branching from the base of the tree are exposed and, with a sharp knife, dig out the sucker and be sure the bud goes too. In a very few years, if your work has been well done, the roots will cease to throw suckers. Cutting off the sucker just under the ground leaves a stub which will throw suckers in addition to the roots, and in a short time you will have a real jungle, so do your suckering religiously the first two or three years they appear, and you will be through.

Pruning

Pruning is a very important item. It does not properly come under this paper and will probably be discussed by Mr. Quarnberg, but I am going to mention a few points anyway.

The type of head used in this section is a decidedly ball head, resulting from practically permitting nature to take her course. The type of head in vogue in Europe is a sort of basin shape, which was described in detail by Mr. Quarnberg last year. The ball head increases in height for a number of years, extending up to 20 feet in the air and makes pruning more difficult than in the basin shape. Mr. I. Van Der Bom, whose knowledge of filberts is not generally recognized, believes the basin shape to be the most profitable, for the reason that it permits plenty of air and sunlight in the center of the tree and is easy to prune on account of the height, about six or seven feet. I have no first-hand information on this basin head, but I do know that profitable results can be secured with the ball head type.

But whatever the shape of the head, the important part of pruning is to force out fruiting laterals. In the filbert the nuts are borne from buds of the preceding season's growth on small lateral shoots and on terminals, and if the tree is permitted to go unpruned few new laterals will be produced, especially in the interior part of the tree. The buds on the old laterals will eventually bear themselves out, and in time practically all the bearing wood will be on the ends of the limbs. To force out these laterals it is necessary to head back the stronger shoots each spring. When they have outlived their usefulness they should be removed.

Interplanting

A number of prospective planters are intending to interplant their groves the first few years. If crops which require intensive cultivation are used, I do not believe any ill results will follow, if several feet are left for the tree rows, and the cultivation is actually done. Berry crops make a good filler and permit an income from the land for several years before the filbert begins to produce in paying quantities, five to six years. Then the fillers can be removed.

The filbert is also an ideal filler itself, as it thrives under shade more than any orchard tree. We are using it ourselves as a filler in walnuts, and the filberts are doing better than the walnuts. The Decoration Day frost cleaned up 20 acres of walnuts for us so completely that we harvested about half a sack from the whole grove, but the filberts were untouched and gave a very fair crop.

Spraying

The Agricultural College is working on a spray control for the bud mite. The only other use of spray in the filbert orchard is to remove moss and keep the trees clean, and should be used once in two or three years, after pollenation has been completed. We have used Bordeaux, 5-5-50, with good results, and a weak solution of lime-sulfur with indifferent results. This last was also used to see the effect on the bud mite, but it is too early to notice results. As the Barcelona is immune to the bud mite, this question is not perplexing us much anyway.

Conclusion

In conclusion, I would state that the prospective planter would do well to investigate the parentage of his nursery stock and be sure it comes from stock of proven yielding and pollenating ability. The filbert trees on the market at present are practically all yearling layered stock, which I regard as superior to grafted trees for the reason that the suckers from grafted trees are worthless and cannot be used in reshaping or retopping. In any case, do not try to save money too zealously in the purchase of your trees, plant well and take care of them.

NUT IMPORTS

(From the American Nut Journal)

Walnuts

Year	Lbs. Unshelled	Lbs. Shelled
1905	16,311,138	4,178,010
1906	15,029,724	4,948,174
1907	23,036,646	7,199,988
1908	21,427,853	7,098,958
1909	17,432,885	8,781,908
1910	23,269,974	10,960,988
1911	21,146,116	11,244,054
1912	22,208,845	10,713,286
1913	16,363,046	10,093,622
1914	16,134,211	11,636,053
1915	20,988,326	10,552,956
1916	13,445,790	13,445,790
1917	13,706,614	13,706,614
1918	3,304,003	9,707,401
1919	21,235,078	10,260,899

Note the decrease during war period.

Filberts

Year	Lbs. Unshelled	Lbs. Shelled
1905	6,669,857	915,227
1906	13,414,887	1,155,734
1907	9,960,280	1,553,332
1908	8,997,246	1,343,594
1909	7,365,837	1,384,689
1910	10,026,961	1,413,391
1911	10,084,987	2,332,606
1912	8,375,860	1,368,835
1913	8,586,278	1,450,620
1914	10,836,072	1,798,147
1915	10,922,248	1,722,705
1916	10,003,552	1,259,540
1917	16,468,547	2,280,787
1918	7,432,534	4,245,863
1919	16,747,304	3,778,986

FILBERT CULTURE IN OREGON

By A. M. Gray

The filbert belongs to the hazel family of plants. Through many generations of men, the filbert has been improved by selection and cultivation, until now we have a plant that grows into a very respectable tree.

Here in Oregon we have a few trees with the trunks a foot in diameter, and a good many with trunks eight to ten inches in diameter.

In England, I am told, there are filbert trees 100 years old with trunks two to three feet in diameter. In this work of development, man was looking for more than mere size of tree; he was looking for quality and quantity of the nut. I do not know what the production is in the countries around the Mediterranean Sea and in France and England (the home of the filbert), but I do know that there are a good many trees here in Oregon that yield regularly from 20 to 50 pounds per tree, and I have heard of even larger yields.

Up to the present time, the business of growing filberts in Oregon may be said to have been in the experimental stage, but from actual results in the oldest of the small groves, it is fair to conclude that the business is now on an estab-

lished basis, and any one who will plant a grove of the proper varieties in any good soil, either hill or valley, and give it as good care as is given to prunes, apples, pears, etc., may feel perfectly sure of as good or better and quicker results as can be obtained with any of the tree fruits, and with a great deal less grief.

Filberts are as nonperishable and as staple as wheat, and will cost not much if any more to produce, pound for pound, than wheat, and more pounds per acre.

But what the people of Oregon should be interested in are the varieties to plant and the care necessary for good results.

Varieties

Barcelona—the standard commercial variety. The tree is a good thrifty grower, a steady prolific producer, and should comprise about 80 per cent of any planting.

DuChilly—a fine nut. The tree does not grow to the size that the Barcelona does, is much less productive than the Barcelona, but 10 per cent of DuChilly should be planted with the Barcelona, scattering through the grove, as pollenizers.

Clackamas—If they can be obtained, a few should be planted neat the DuChilly trees, and for the last five per cent, as many other varieties as can be obtained.

The filbert is a double bloomer, and pollenizing depends upon the wind, and cross-pollenizing is the rule of this tree—hence, the different varieties should be planted scatteringly through the grove.

One last word. The greatest drawback to filbert growing is the stooling or sprouting around the base of the tree.

During the past five years I have spent days in a number of the older groves of the State. I have failed to find one single sprout growing from a root of a filbert tree. I tried the experiment of planting some trees (Barcelona) well up out of the ground—two to three inches shallower than they grew in the nursery. None of them sprouted below the ground level. I could rub the sprouts off with my fingers.

There is much room for experimentation along this line. I am planting a grove this winter, and I shall expect it to be sproutless.

Plant filberts in ground in which the wild hazel grows.

THE PRUNE

By Robert C. Paulus

The statistics compiled by the assessors for the year 1920 showed a considerably larger acreage of both bearing and nonbearing prunes than the statistics for the year 1919. Below is a comparison of the statistics for the two years for the dried prune producing counties of the State of Oregon.

	Bearing		Nonbearing	
County	1919	1920	1919	1920
Benton	864	755	40	115
Clackamas	682	853	310	326
Douglas	2,941	3,045	1,951	2,918
Linn	312	784	66	226
Marion	6,611	6,907	1,695	1,794
Multnomah	76	78	12	.....
Polk	3,096	3,833	887	3,042
Tillamook	212	212	.....	.....
Washington	936	1,881	419	597
Yamhill	2,217	3,963	1,410	3,241
Lane	No census	1,158	No census	658
Jackson	No census	110	No census	2
Total	17,947	23,579	6,790	12,919

The difference in the acreage is accounted for by the fact that the last statement from the assessors is more thorough than the one the year before. Even the last statement does not include quite all of the acreage as shown by the fact that the Oregon Growers Cooperative Association has more acreage signed up in several of the counties than are actually listed. Added to the above acreage a total of about 3,000 to 3,500 bearing acres and probably 2,000 to 2,500 nonbearing acres in Clarke County, Washington, we will have a total of approximately 27,000 bearing acres and 15,000 nonbearing acres in the State of Oregon and Clarke County, Washington, which is the only county in Washington which does much evaporating.

The crop during the past season, which shortly before harvest was estimated at between fifty and sixty million pounds, was cut by rains to approximately twenty-five million pounds or slightly less, while the crop in California is now estimated at around 155,000,000 pounds, a total for the Pacific Coast of about 180,000,000 to 185,000,000 pounds, and counting the carry over from last season's crop the total to be consumed will probably run around 200,000,000 pounds. As near as can be definitely ascertained the domestic consumption of prunes in the United States last season was 210,000,000 pounds so it is evident that unless there should be heavy unemployment throughout the country, thereby making a heavy decrease in purchasing power of the consuming public, there are hardly any more than enough prunes to go around provided the consumption is as large as last year.

During last season approximately $250,000 were spent for advertising prunes and this money was used by the California Prune and Apricot Growers Association in establishing their Sunsweet brand. This season there will probably be around $400,000 spent by the California, Oregon and Washington associations for advertising prunes and this should have a considerable effect upon the trade.

The prune industry at present is confronted with slow sale due to the tightest financial condition that the wholesale grocery trade in the East has seen for many years. With the gradual clean-up of the canned goods pack, which was much shorter this season than last year, the very much lower sugar prices as against the high sugar prices last year and the gradual cleaning up of the 1919 prune crop carry-over, many Eastern factors predict a good demand for prunes after the first of the year.

AN ALL-STAR PRUNE ORCHARD

By Earl Pearcy

County Fruit Inspector Washington County

This being the open season for all-star aggregations, I thought it would perhaps be appropriate to attempt to pick out an all-star prune orchard. When your secretary asked me to give my observations as a fruit inspector on the subject of prune growing I thought he was joking for it would seem that no sane man would attempt to feature prune growing on the annual program of the Horticultural Society, after such a disastrous harvest season followed by a falling market. The average prune grower in the Willamette Valley is just now in a state of flux—not knowing whether to go ahead vigorously with his work or to mark time, so to speak.

A fruit inspector in his official capacity has ample opportunity to observe this tendency because he sees what the growers are doing in the various districts. In one place there may be a grower who is doing one thing well—say cultivation; in another district another thing, say pruning, while a neighboring grower, because of good spraying and fertilizing practices, may be obtaining much better results than either of the others.

GATHERING OREGON PRUNES—PAULUS BROTHERS' ORCHARD

Why is it that some orchards sell for from $1000 to $1500 per acre, while the average prune orchard will bring only $400 to $500? Is it location entirely, or soil, or appearance of the trees or conditions of the orchard for heavy production, or is it not rather a general blending of these qualities which places the high value on an orchard?

Model Orchard

It would be a fine thing if we could choose an orchard in each prune growing district of the state so nearly perfect that it could be labeled as a model, so that others might pattern their practices after it. As a matter of fact, it would be difficult for any three prune growing authorities, such as Dr. Scarbrough, Professor Lewis and George Zimmerman, to pick out any single ideal tract and label it as a model. Why not then pick out one on paper as the football critics are doing just now in deciding upon all-star gridiron aggregations.

Paying on Investment

The first consideration is to win games consistently, which translated into prune terms means to produce profitable crops annually. Because in the final analysis other items lack attention such as pruning, spraying, cultivation, etc., if they fail to result in yearly profits on the investment.

Mythical Orchard

Our mythical orchard then will produce two tons of dried prunes per acre each season, 75% of which will grade out 30-40's. In other words, it will bat 300% . There are occasionally orchards which will do this in one very favorable season, perhaps. Why then, given the right conditions of soil depth and moisture content, location with regard to frost and labor, vigorous health fruiting wood free from moss, lichens, scale and heart rots, can not these results be secured regularly?

Soil Adaptability

Thin soils, wet soils, heavy soils—none of these are conducive to best results. In our inspection work we notice that the likelihood of finding pests and diseases increases as the depth of the soil decreases or as either extreme of wetness or drought prevails. Cultivation practices, spraying, etc., can not place trees in this location on par, with regard to disease resistance, with orchards located on moist, friable, rather deep soil. Where the roots are weak and improperly nourished, the fruiting wood can not function properly. On account of frosts and occasional severe winters, the lowland sites will not rate up to the class of our mythical all-star aggregation.

First place on this team for soil adaptability will be given to the foothill districts extending from Sheridan north to David's Hill at Forest Grove. Here we find good, rich, deep, well drained soil adaptable to prunes. It is soil that is economical to operate, easy to hold moisture, responds to fertilizers and is deep enough to give the roots ample opportunity to develop. Due to the fact that frosts seldom prevail in the rich Missouri bottoms in the South Umpqua, second place for this position might be awarded to her, but this district is being saved for another position on the all-star team.

Spraying

Second position considered would be spraying. This is not the most important place in prune growing, by any means, but nevertheless ranks high in the estimate of fruit inspectors. The reason is apparent. Ordinarily San Jose scale is not considered a serious pest in a prune orchard because it is so easily handled. But the fact remains that the better growers spray pretty regularly with lime-sulfur. This spray keeps the bark clean and free from moss and lichens and

BEAUTIFUL ITALIAN (OREGON) PRUNE ORCHARD—PAULUS BROTHERS, SALEM, OREGON.

in the opinion of many growers stimulates the fruit buds into greater activity. Moss and lichens cause what is known as "tight bark" which restricts free sap circulation, which in turn causes weakened fruit spurs. Weak spurs shed their bloom under the slighest provocation—light frosts, rains, etc., whereas strong buds will often resist them. The average grower believes that such orchards are badly infested with scale. Such, as a matter of fact, is seldom the case. The scale can not thrive on hard, tight bark and readily succumbs to the advance of the moss and lichens. I have observed that growers who spray regularly every other year usually take good care of their orchard in other ways. For this reason I attach more importance to this position than others might. First place is given to the Myrtle Creek-Riddle district in the Umpqua known as the "Missouri bottoms."

Cultivation

Cultivation is too often discussed to require much explanation. The best practice of late years seems to be to plow in a cover crop of vetch early in the spring, followed by careful cultivation and constant working until the sizes are all that could be asked—that is, 30-40's. Cultivation should become shallower as the season progresses and it is not considered good practice to use the disk any later than necessary because it dries out the soil. Level cultivation has completely replaced the old ridge system which stifled the life out of so many old orchards. Cultivation is perhaps the best understood practice. More growers cultivate well than follow any other practice. For this reason Sheridan, the Winston district near Roseburg, Scotts Mills, Eugene, or Dallas rate up equally well, with the speaker's preference going to Dallas.

Pruning

Pruning the older orchards resolves itself into a thinning operation. Open well lighted trees, with little of the barren drooping wood or lifeless fruit spurs is what the better growers strive for. It is easy to say, but too seldom done. I have in mind the Petite orchard of Joe Schneider in the Day's Creek country in Douglas County as perhaps one of the best pruned old orchards in the state. As a district, however, the Salem region rates up and takes the position. It is strange but true that the men who spray usually prune well, but that the men who fertilize and cultivate often neglect pruning entirely. There are many men who do one of the three things well, prune, spray or cultivate, and some who do two of them, but very, very few who do all three well.

Fertilizers

Theoretically an orchard with proper soil and care does not require additional fertilization. In practice, however, we find that a reasonable amount of nitrate and humus added at the proper time serves to force the trees to their maximum of effort. Stable manure when it can be obtained cheaply is perhaps the best fertilizer we have for prunes. Of late years it has been too scarce and expensive for use except in extreme cases where the orchard was rapidly slumping. Nitrate of soda, 3 to 5 pounds to the tree, applied 4 or 5 weeks before blossoming, is the standard practice. Where the orchard is otherwise in good condition with regard to other practices a lesser amount seems to be justified. Reuter, one of the best growers in Washington County, uses about one-half pound. Cover crops of vetch find a place in all tip-top orchards where excess quantities of manure can not be had.

Location

Location bears an immediate relation to the economics of prune growing. Proximity to labor, fuel, trucks, etc., is a big item, although nearly all of the districts are adjacent to good live towns. Social and educational advantages

must be considered. Salem, perhaps, claims just title to location, as most of the orchards are situated on good roads close to the capital city.

Size

As to size, there is a certain economical unit generally considered between 25 and 40 acres. That is perhaps the most satisfactory acreage to handle, all things being considered. Yamhill and Dundee are in favor for this position. However, with the tractors and community dryers coming to the fore, perhaps larger units will become more popular, in which case Creswell and the Polk County Hills across from Salem should be considered.

Composite Orchard

Thus, if we could visualize a composite of the best orchards in the state, choosing from Day's Creek, Riddle, Myrtle Creek, Winston, Eugene, Creswell, Salem, Dallas, Sheridan, Yamhill, Dundee, Forest Grove, and Estacada, I think that any one in this room would be willing to pay $2,500 cash per acre for it providing it had for a manager a Johns, Weaver, Scarborough, Paulus, Elliott, Zimmerman or Reuter.

Such an orchard would have deep hill soil, free, rich and easy to handle; trees would be large and healthy, with plenty of vigorous young fruiting wood free from heart rot, moss, lichens, or scale, and spraying, fertilizing and pruning practices would function hand in hand. It would be located near a good, live town, with social, educational and banking alvantages and would contain sufficient acreage to be operated economically. At the end of each year the bins would contain two tons of 30-40's per acre. However, they used to say in Douglas County that it is hard to please a fruit inspector.

THE FIG IN OREGON

By R. R. Amend, Portland, Oregon

It is safe to say that no deciduous tree grown in the semi-tropic and temperate zones will adapt itself to a wider range of climate and soils than the fig.

Figs can be used for such a variety of purposes, namely: Drying, canning, preserving and in the fresh state and for home uses, that a wide range is open for their successful exploitation, the Ficus Carica, or common fig, is but one of more than one hundred species of the fig family which, from the earliest of ancient times has in its varying forms been accorded not only a place of importance but honor and reverence.

Biblical records mention the fig as clothing, as food, as medicine, and in the matter of clothing were it still "the fashion to wear 'em" the fig leaf would be particularly enhanced in value a fact due to infinite variety of its patterns, two leaves, even on the same tree, never being found exactly alike, featuring "exclusive designs". In the matter of food values according to scientific analysis, the fig has no equal, the only other fruits approaching the fig and these vital essentials are the date and the prune.

All animals and insects are in love with the fig. Dogs, chickens, snakes and bees have been known to eat them.

The first figs introduced in the United States were brought, as nearly as can be determined, by the Spanish padres from Mexico in the year 1769. They were planted at the San Diego Mission.

We must admit that if it were not for Italian, Austrian and Syrian people, who so in love with the native fig of their home country, were kind enough to bring it with them to the sunny clime of Oregon, we would still be in the dark as to the varieties that grow and ripen their fruit here.

It was not by chance or by anyone who might claim to have propagated these figs; due credit must be given to these native-born sons who did bring this horticultural triumph with them, although they have guarded these varieties of figs here in Oregon as our people guard precious jewels. It was with much perseverance, time, endeavor and courage they even secured an opportunity to propagate these figs. These varieties, both black and white, ripen one and sometimes two crops each year here in our wonderful Oregon climate and produce similar perfect fruit as in their native climate, as this Oregon climate is similar to the climate of some European countries.

The fig trees will withstand a temperature of 18 degrees Fahrenheit in the winter months without being injured, hence their geographical distribution is very wide.

The fundamental difference between the Adriatic and Smyrna class of figs is that the former matures its fruit without the aid of the fig wasp, while the latter does not. The Adriatic figs seem to possess all the qualities of the Smyrna so far as general appearance goes. In the Smyrna type of figs, unless pollinated, they drop off and never mature. The fig is a fleshy receptacle to which is attached thousands of minute flowers. It differs from all classes of fruits in that no other ordinary insect can reach its flowers, because the receptacle in which they are inclosed has only one small opening in the apex of the fig, which to all appearance, as far as human intelligence and eyesight can discern, it would be impossible for any insect to enter. Fortunately for the thousands of people who enjoy eating the fig, a great many varieties mature their fruits.

In the State of California they produce annually 22,000,000 pounds of figs of the Smyrna, Calymrna, Black Mission and Adriatic species. This is why I wonder that Oregon, her sister state, grows thousands of fig trees, but so far as records show, has not produced one ton of ripe figs commercially.

In the past 25 years we have grown certain varieties of figs that have been ripening their fruits year after year, and inasmuch as these varieties have not been propagated as they should have been, hence the only reason why we do not see the fig growing in Oregon commercially. We know that if the fig will stand zero weather without injury, there is no reason why it cannot be grown and make one more new industry for Oregon. If they freeze down to the ground, being the most rapidly growing fruit tree in Oregon, they will replace their growth in a short time of two years and again reward you with a golden crop of figs. The trees can be grown in bush form like they do on the Island of Capri, their native home, or in tree form as they are grown in Asia Minor.

I have, in the past ten years, with the valuable help of the United States Department of Agriculture and the kindness of a Mr. H. A. Henneman, who is president of the Walnut Growers' Association, made a study of figs that mature their fruit in this Oregon climate. We have learned that only certain varieties will adapt themselves to more than a limited amount of dampness and rain. After much study and trial work we have selected three varieties, including white, black and yellow varieties. They have proven to our satisfaction they will grow commercially in Oregon.

There is no good reason why the people of Oregon have not given this valuable fruit more thought. It seems to me most fig trees grown in Oregon are more for shade and ornamental purposes than for the most delicious fruit that they should bear.

The day is not far hence that the fig will not only answer for a desirable shade tree, but will produce abundance of the finest and the most healthful fruit grown in Oregon.

THE LOGANBERRY

By H. S. Gile

Loganberries are today attracting almost universal attention among those horticulturally inclined, notwithstanding the fact that loganberry growing in the Northwest has not been at all times a profitable undertaking. It is not so many years since they were a novelty; in fact, the berry was created or discovered not so very long ago by Judge J. H. Logan. The following extract from a story written by him many years ago will best tell in his own words how he did it, and what his part was in the matter:

"In 1880 I planted in my vegetable garden in Santa Cruz, Cal., all the varieties of blackberries and raspberries obtainable. These were planted without any reference to the association of varieties, with the exception that I planted the Texas Early (a highbush) in close proximity to the California dewberry (ursinus), having in mind a possible cross between these two berries, it being generally conceded that the wild blackberry for flavor is without a peer, but on account of its many adverse characteristics, its cultivation is limited.

"The Texas Early, while not so desirable, possesses qualities for the purpose of crossing, not possessed by any other blackberry, that is, early and long-flowering period, also being unisexual or staminate. I saw a possible cross between these two varieties which, if successful, would be an improvement upon both. They were therefore planted side by side. By the merest accident, not deeming a cross possible between the blackberry and the raspberry, I planted a variety of the Red Antwerp, which was one of the best raspberries growing in Santa Cruz at that time.

"In 1881 the plants bore. In pursuance with my original intentions, the seed of the dewberry was taken and planted in August of that year. About 300 seedling plants were produced. They were very much alike in appearance, but in the spring I noticed one of the seedlings quite unlike the others, having somewhat the appearance of the raspberry. This, as it developed, was the loganberry."

Characteristics of Loganberries

The fruit to which Judge Logan gave his name possesses many of the characteristics of the native wild blackberry, except in color and appearance, which are strongly raspberry, with a blended blackberry and raspberry flavor, containing, however, more piquancy and richer color than either of the parents.

Judge Logan evidently was not a very strong promoter. He admits that he never made any money from the discovery and propagation of the loganberry. At any rate, not very much was heard concerning this berry, to which he gave his name, until about 1895, when it made its appearance in Oregon and proceeded to make itself very much at home in the moist rich soil and mild climate of the Willamette Valley, where it began to produce enormous crops and to attract considerable attention.

Between the years 1897 and 1908 a considerable acreage of loganberries was planted in the Willamette Valley, resulting in rapidly increasing production, without any constructive effort having been made to provide markets for this new fruit.

It did not require a very great tonnage to supply the local demand. Some spasmodic attempts were made to ship loganberries East in their fresh state, the shippers feeling certain that their great size and fine appearance would insure long prices and large profits, but the very qualities which were destined eventually to make loganberry juice a commercial possibility defeated the hopes of the fresh fruit shippers. Loganberries as produced in Oregon were too juicy to successfully stand long-distance shipment.

The canners about this time began to take notice. They used a few loganberries and gradually increased the quantity canned, for which they paid about

four cents per pound, a very satisfactory price. Furthermore, they indicated their faith in the future of canned loganberries by writing a few long-term contracts with certain growers. This had the effect of creating among them a somewhat optimistic spirit as to the future of this wonder berry as a canned fruit.

Acreage Increase Rapid

Acreage increased rapidly, resulting in a rather badly overstocked market in the year 1912; in fact, by that time there was practically no market. Numerous experiments were being made at about this period by growers and others in drying loganberries. Some very fine appearing samples were produced, and by many the conclusion was immediately reached that dried loganberries would prove to be the solution of the market problem.

The great consuming public of the United States, however, did not know loganberries; had never heard of them. The natural consequence of this national ignorance concerning loganberries was a lack of demand for them, either canned or evaporated, which quickly resulted in an accumulation of stocks which could not easily be marketed, and for that reason canners did not continue to be steady buyers, contenting themselves with the supply which they received from their growers who held term contracts.

The open market therefore dropped from four cents to two cents and less, and it was not possible to dispose of any large tonnage, even at a price which represented less than the cost of production.

During these years while loganberries were so cheap, there were many people who were making various uses of loganberries in their own kitchens. Scores of persons known to the writer were making and canning loganberry juice as they canned other fruits, surprising their guests with a drink entirely new and wonderfully good. They also found that for the purpose of making punch, fruit cups, or for jelly, it was unsurpassed, but it was not until the growers began to seriously threaten the destruction of their vineyards in 1913, because of lack of markets for their fruit, either fresh, canned or evaporated, that any extensive commercial test of pressing and making loganberry juice in a large way was attempted.

The crops of almost the entire Willamette Valley in 1913 had been evaporated, chiefly because there was no other outlet for the fresh fruit. This simply meant that the fruit could be kept considerably longer in its evaporated form, but there was, however, little or no demand for evaporated loganberries, and in the spring of 1914, with a new crop almost at hand and the warehouses at Salem still loaded with the 1913 evaporated loganberries, the growers' outlook was certainly not very bright.

Education of Public Need

The great problem was how to teach millions of consumers the real value of evaporated loganberries quickly enough to save the community from a serious economic loss and setback, such as would occur if the growers should generally destroy their plantings.

The crop of 1914, as in the previous year, was pretty generally harvested and evaporated. There was practically no other alternative. While these two crops of dried berries were being peddled about and all sorts of persuasion and salesmanship failed to induce the large eastern distributors to become very enthusiastic about the product, the very cheapness and fine appearance of the fruit secured a rather wide, though limited, distribution, and likewise caused many consumers to try loganberries once, and they liked them.

These two crops brought the growers little or no profit, but the distribution of evaporated loganberries over such a wide territory resulted in creating in certain districts a steady consumer demand of sufficient importance to absorb considerable tonnage annually. However, quick action was now absolutely necessary, because some growers were already destroying their vineyards, and very

LOGANBERRY PLANTATION—WILLAMETTE VALLEY, OREGON

many were seriously threatening not to produce another crop, because evaporated loganberries had not at this time, from the growers' viewpoint, created a place for themselves, and at the best, their future was considered very uncertain.

This situation is now so completely reversed that the production of evaporated loganberries in 1919 was very far from supplying the demand. This feature of the industry should interest owners of land suitable for loganberry growing, but which is located so far from manufacturing plants and other markets that heretofore they have been content to take only a small return per acre, using it for pasturage and other similar purposes, and have valued the land accordingly. Ten, twenty or more acres planted to loganberries, with a simply constructed dryer, will make those acres just as valuable from the standpoint of production value per acre as land which may be worth $500 or more, because of its proximity to a city or town.

The men who later organized the Pheasant Fruit Juice Company sent one of their number East to make a thorough study concerning the possibility of commercializing loganberry juice. They became convinced that loganberry juice could be made a great commercial asset to the Northwest, providing it could have a sufficiently strong advertising and merchandising campaign.

The first real encouragement to the growers came when they were assured by this juice company that it was ready to make at a fixed price long-term contracts which promised more than fair profits for all the loganberries which they could grow. It was here that the re-creation of the loganberry industry in the Northwest began. Many vineyards had been destroyed, but the greater number and the best of them were still in the ground in the spring of 1915.

This infant company, undertaking to save the loganberry industry and market the product in the form of loganberry juice, realized fully that they were undertaking an enormous task; that they were attacking a problem which would require vast expenditures of money, and would tax the nerve and staying qualities of men full of faith in their product and in their own power to succeed in their task.

The Phez Company is the consolidated outgrowth of the Pheasant Fruit Juice Company and the Northwest Fruit Products Company, two of the largest of the pioneers in the fruit juice business, whose general offices are at Salem, Oregon, with manufacturing juice plants at Salem, Olympia, Woodburn and Wenatchee, and with a very extensive and complete jam and jelly plant also located at Salem.

A visit to these plants will convince the most pessimistic observer that the directors of this great business enterprise have faith in themselves and in the ultimate future of their undertaking. Large investments have been made in expensive permanent equipment. Hundreds of thousands of dollars have already gone into national advertising and other publicity, placed there by the managers of this company, whose vision is broad enough to permit them to view without envy or discouragement the growers, the land owners, now advertising manufacturers and dealers in the same products, and the entire community making large profits and enjoying a new prosperity, because of this company's enterprise and their vast expenditure of money, holding themselves to the firm conviction that in due time they also will reap a reward for themselves and their associated stockholders.

World Fame Achieved

They believe that these are days of solid foundation building, upon which will eventually stand a great, well-established manufacturing industry, owning and controlling an enormous national and international demand for their advertised products, profitable not only to themselves, but to thousands of producers of raw materials, and to the State at large.

The demand for loganberries had become so great in 1918 that there was far from sufficient fruit to supply. This demand came not only from many entirely

new local buyers, but from buyers far outside the district where the fruit was produced.

Buyers were so eager to secure large quantities of loganberries that they were willing to take them from the growers in their own fields and at prices which, in many cases, especially in 1919, made the crop worth more than the total value per acre which the owner had in his most optimistic mood ever expected to be able to realize for his land.

It is believed that this demand is upon a solid basis, one which will continue to increase, keeping pace with increased production, and that it will continue to absorb all of this wonderful fruit that may be grown in the Northwest.

Thousands of acres will be planted during the spring of 1920, and the fruit from every acre of loganberries thus planted can be contracted before the loganberry tips are put into the ground, for a period running from five to ten years from date of the first crop, if the grower wishes to play a perfectly safe game.

The most ideal condition for the best interest of the growers, community and manufacturers would be several thousand families owning, planting and cultivating their own small tracts, just large enough to be handled and harvested within the family, thus conserving to the family all of the expense which would otherwise go into cultivation and harvesting of the fruit. It need not be pointed out that such a condition would mean a lot of extra money to a large number of families throughout the State, which would, in turn, mean prosperity to the communities where they reside.

Other Fruits Demanded

With the demand for loganberries, has also come the long-delayed demand for other small fruits, which cannot be produced anywhere else in the wide world better than in the Northwest. It has been learned through experience that with the fruit juice business, the jam and jelly business works to perfection, and interlocks the one with the other to the very great advantage of the manufacturer of fruit juices. Thus one successful industry brings with it other industries, and we are all agreed that the Northwest needs nothing more than industries and their accompanying pay rolls.

Could there be a more solid basis for the continued financial prosperity and upbuilding of the Willamette Valley and other valleys of the Northwest than vast acres planted to small fruits yielding several tons per acre annually, for which there is a steady and profitable market? That such a market can be created has already been demonstrated. Such a condition means steady distribution of money for employment during the cultivation period; it means pleasant and profitable employment for many thousands of women and children during the harvesting period; and continuous all-the-year-around pay rolls in the factories, where the finished product is completed as it should be in our own towns and cities, located side by side with the lands and farms where the raw material is produced. In addition to this, the advertising and the distribution of these finished products throughout the wide world spreads Oregon's name wherever the products are sold and consumed.

It need hardly be said that the present prosperity, which is quite general throughout the Willamette Valley, is due in no small measure to its fruit industries, among which the loganberry has taken front rank, and when the loganberry vineyards in the central Willamette Valley shall have been increased by 20 or 30 times the present planted area, it will bear some resemblance to the great Chautauqua grape belt along the south shores of Lake Erie. It will differ, however, in the fact that the loganberry vineyards will be many times more profitable to the producer and of greater value to the community, because of the potential market for the many products which they will yield.

THE STRAWBERRY ROOT-WEEVIL*

(Otiorhynchus ovatus Linn)

By Prof. A. L. Lovett

The strawberry root-weevil is by far the most injurious insect pest of the strawberry in Oregon. Just recently the serious nature of the pest has been brought into prominence because of the quarantine imposed by California against Oregon plants from certain specified regions believed to be infested with this weevil.

The strawberry root-weevil was undoubtedly introduced from Europe. The first report we have of it in this country is in Massachusetts in 1852. Since that time it has spread steadily westward and also northward, reaching Michigan in 1878, and being reported as a pest to the strawberry in Southern Michigan in 1884. This same year, 1884, it was reported from Ottawa, Canada. It was reported from Wyoming in 1893, from New Mexico in 1894, from Minnesota in 1895, from Montana in 1897, and from Washington in 1904. When we consider the fact that this insect cannot fly but must depend almost entirely on outside agencies for transportation, its spread seems fairly rapid. In a succeeding paragraph on the habits of the weevil this phase of the question will receive a more detailed consideration.

The first report we have of the weevil as a strawberry pest in Oregon is in 1900, from near Montavilla Station. In 1908 it was doing serious injury to strawberries in the Milton-Freewater section of Umatilla County. In 1911 the insect was seriously injurious on strawberries in the small fruit sections about Mt. Tabor, Gresham, Russellville and Oswego in Western Oregon, and in the Walla Walla Valley of Eastern Oregon. It was present in the Hood River Valley, but not in such destructive numbers.

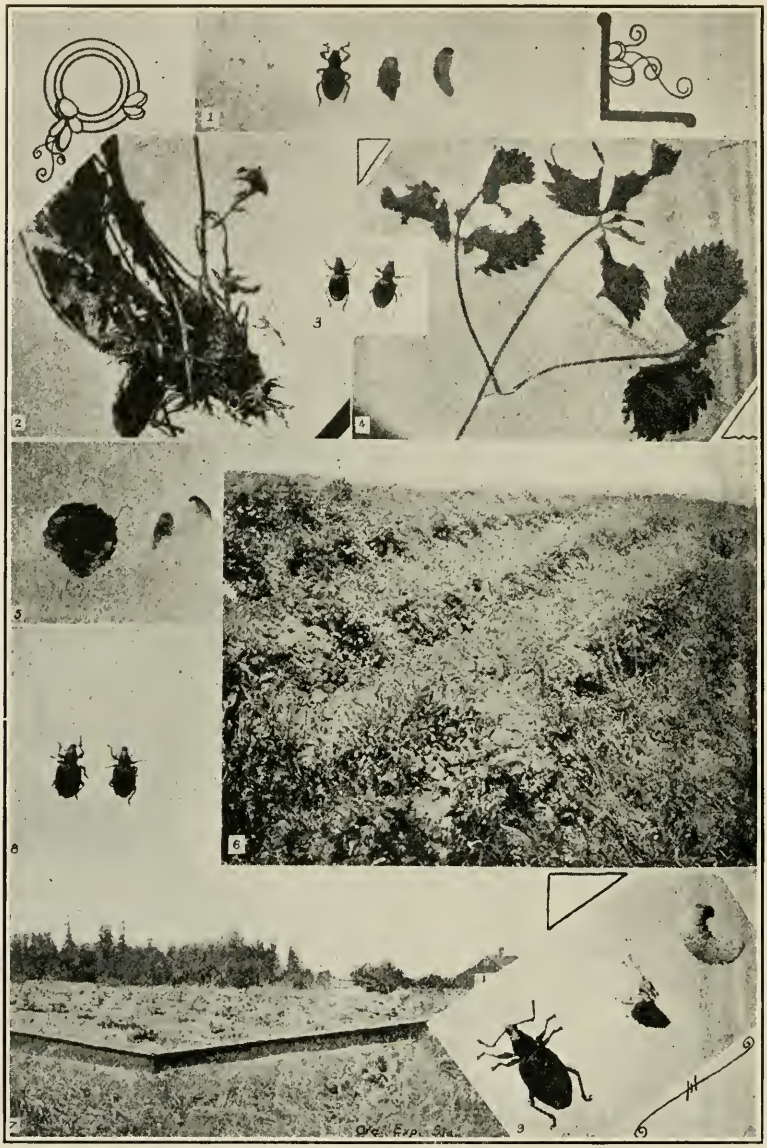
The present distribution of the weevil in Oregon is not definitely known. It is hoped to complete surveys soon that will give us this much-needed information.

Destructiveness

The strawberry root-weevil is a pest both as a beetle and as a grub. The beetles feed on the foliage, stripping and ragging it in a characteristic manner (See Plate —, Fig. 4). The grubs, however, are by far the more injurious. They feed on the entire root system of the strawberry. The smaller grubs are usually found feeding on the fibrous rootlets, often devouring them entirely or barking them so that they die. A seriously infected plant may be kicked out with the foot or easily pulled up, often with the fibrous root system eaten away. Undoubtedly a portion of the grubs feed closely about the main tap root, and their feeding there will sometimes girdle the crown. The larger grubs are often found buried in the tap root, and this food seems to give them a more pinkish cast, giving rise to a common belief that two species of larvae are present.

These beetles may be present in a patch for years and but little injury result from their attacks. In certain localities where I have noted their presence, the growers assure me that they have observed them for several years, yet even the older fields show no apparent injury. The common practice in the strawberry districts of Oregon is to plant in the early spring, cultivate well the first season and keep down all runners. A half crop is expected the next season and a full crop the second season or the third spring from planting. Ordinarily the fields are kept as long as profitable, and too often, in the infested districts, even longer. In the weevil districts, under normal conditions, an infested patch will show a few sickly hills the first season, small patches here and there dead the second season, and the patch rendered worthless the next spring. This affords one full crop in our system of culture. A condition that is becoming quite common, however, is

*Abridged and revised from Bien. Crop Pest and Hort. Rept., 1913.



OTIORHYNCHUS OVATUS

1. Eggs, adult, pupa and larva. 2. Plant showing root injury. 3. Adults, O. ovatus. 4. Leaves showing feeding punctures of adults. 5. Pupal cell in soil. 6. Infested strawberry field. 7. Corner of barrier used in experiment. 8. Adults, Otiorhynchus rugifrons. 9. Adult, pupa and larva of large weevil found at Milton, Oregon. (Original. Insects natural size.)

for the patch to be materially weakened the first season, and the second season, or the first expected to yield a full crop, the patch is absolutely worthless. Two factors render this condition possible. The soil is often already infested with the grubs, even though strawberries have not been grown on the ground previously, and again the beetles from older infested beds all about tend to concentrate on the new patch. In the various districts about Portland several types of soil are found, various cultural methods are practiced, and every graduation of infestation and injury occur.

Host Plants

While we have so far discussed this weevil as a pest of the strawberry, it is by no means confined to this host plant. Both the larvae and the beetles have a wide and varied list of host plants to their credit and, no doubt but that as our studies continue, the already complex list will be yet further extended. The raspberry, blackberry and loganberry are about all of our cultivated fruits, aside from the strawberry, which seem at all generally attacked in Oregon, and it is not believed that the weevil will prove a serious menace to these hosts. It is very essential, however, that we know the host plant list, and for that reason we will attempt to give it in its entirety as reported up to the present time.

Host Plant List for Adult Beetles of O. ovatus

1. Strawberry.
2. Raspberry
3. Loganberry
4. Blackberry
5. Roses and other shrubbery
6. Borage
7. Currant
8. Muskmelon
9. Sorrel (Rumex acetosella)
10. Wild rose
11. Balsam root (Balsamorhiza rogatata)
12. Potatoes
13. Wild buckwheat
14. Hemlock
15. Pumpkin
16. Wheat
17. Corn
18. Cabbage
19. Cherry
20. Red clover
21. Apple (fruit)
22. Dahlias (bloom)
23. Orchid (fruit)
24. Apple
25. Cauliflower
26. Red clover (blossom)
27. Woodbine
28. Tartarian honeysuckle
29. Turnip
30. Radish
31. White clover
32. White clover (blossom)
33. Oak
34. Dandelion
35. Lettuce
36. Maple
37. Lawn grass
38. Timothy grass
40. Mulberry
41. Spirea
42. Rose (bloom)
43. Plantain
44. Celery
45. Mountain ash
46. Roman wormwood
47. Rhubarb
48. Bean
49. Nasturtium
50. Wolf weed
51. Nightshade
52. Box elder
53. Thistle
54. Cottonwood
55. Elm
56. Geranium
57. Flowering currant
58. Dahlia
59. Syringia
60. Peony
61. Fall dandelion
62. Asparagus
63. Horseradish
64. Chick weed
65. Wild cherry
66. Gooseberry
67. Birch
68. Iris
69. Willow
70. "Self Heal"

Host Plant List of Larvae—Root System

1. Strawberry
2. Raspberry
3. Blackberry
4. Loganberry
5. Wild strawberry
6. Sorrel (Rumex acetosella)
7. Grass (Poa cerotine)
8. Timothy
9. Bluegrass
10. Potentilla glandulosa
11. June grass
12. White clover
13. Hemlock

Description

The Adult Weevil is a snout beetle, 6 mm., or nearly one-fourth of an inch in length. The color of the insect varies from a dull reddish brown when freshly emerged to almost pitch black; the surface is roughly pitted and slightly shiny. The beak is short, broad and emarginate at the tip; there is a distinct puncture between the eyes. The antennae are elbowed and consist of nine segments. The proximal segment is set in a pit; it is elongate, finely haired with light yellow fluff, slightly curved and enlarged toward distal end to form the socket of the elbow joint. The next seven segments are bead-like with coarse dark hair. The distal segment forms an ovate knob and is finely haired the same as the proximal segment. The thorax is nearly globular, tuberculate, pitted and coarsely grooved. Each tubercle bears a short hair. The body behind the thorax is oval, the striae more uniform. There is a distinct, narrow, dark shining ring between the thorax and body proper. The femur of each leg bears a spur. The beetle is without wings, but with elytra very hard and securely grown together. Upon removing the elytra, rudimentary wing pads are found still present.

The Egg is about .55 mm. in length and about .29 mm. in width. It is milky white with pronounced translucence when first deposited, later changing to a dirty yellowish brown. It is smooth when first deposited, but indentations soon appear, and by the time it has assumed the darker color it is decidedly roughened.

Larva—The length of the larva at the time of hatching is .75 mm., the breadth of the head during the first instar, .24 mm.

Weed describes the larva and pupa as follows:

"**Larva**—All of the larvae which were seen eating were of a pinkish tinge, but when compelled to fast, became white. The full-grown larva is three-eighths of an inch long by one-eighth of an inch wide; white, except the head, which is light brown, with the mouth parts darker and the edges of the jaws black. The head is smooth except for four transverse rows of light brown hairs. The body is arched; on each segment is a row of reddish brown hairs, curved at the tip on the back, but shorter and not curved on the under side. The dorsum or upper part of each ring is divided into three transverse lobes or folds, all except the first and the next to the last of which are smooth. On the under side of the first three segments are tubercles in place of feet; these possess stiff hairs. On the sides of each segment are two triangular tubercles, each bearing two hairs, one of which is but half as long as the other. A longitudinal fissure separates the upper row of tubercles from the lower.

"**Pupa**—When first transformed, the pupa is pure white, three-eighths of an inch long by two-eighths of an inch wide. The head and snout are bent against the breast, the latter not quite twice as long as wide, tapering slightly toward the tip, the jaws plainly visible. The elbowed antennae extend to the base of the wing cases; the abdomen terminates with a pair of incurved hooks. On each segment of the head and thorax is a transverse row of spinous, reddish brown hairs terminating by recurved hooks. On the outer end of each femur (thigh) is a pair of similar spines, the inner but half as long as the outer. On each segment of the abdomen is a transverse row of reddish brown awl-shaped bristles.

"A day or two after transforming, the black eyes show through the pupal envelope at the base of the snout, and in a few days more the mouth parts and

the legs become brown. In about eight days the wing cases develop, and the body becomes light brown, which in a day or two changes to dark brown."

Seasonal History

The strawberry root-weevil is single brooded. The adult beetles may remain alive and active for more than a year. There are then, for a short period of time, two generations of beetles present. These beetles are busily engaged feeding on the foliage of the strawberry and other hosts, ragging and stripping it. The insects pass the winter in both the adult and grub stage. The beetles hibernate in all conceivable sorts of places. Many of them become restless in early September and begin seeking a place for hibernation. Very often in this search they enter dwellings and prove a source of no little worry to the housewife by crawling over and under everything and dropping from the walls and ceiling into dishes and vessels not intended for their occupancy. Many of them remain in the field, hibernating in the soil up close about the crown of their host, or crowded down into the sheaths about the central whorl of the crown. They also hibernate under heaps of leaves and debris about the field, in fence corners, under boards and loose bark. They have been found in bundles of shingles, in bundles of bedding, and in crates of nursery stock and other transportable material. This may account in a large measure for their spread to new localities. The grubs pass the winter in the soil about the roots of their hosts. A portion of them are mature in late fall and even form in the soil what will constitute the pupal cell. The majority of the grubs pass the winter as nearly mature larvae, feeding to a limited extent on their host. A very few grubs occur during the winter as only half-grown larvae, and these naturally prolong the period of pupation and emergence of the adult weevils in the following spring. The first pupae occur in early May. Our earliest observation of a newly emerged weevil is May 21. In the single instance where I successfully reared a beetle from the larva, the pupal stage was eight days. During late May and June the majority of the new generation of beetles emerge. Even earlier than this the overwintering brood of beetles assume a traveling habit and crawl for a considerable distance. The new generation of beetles also travel, and during May the housewife is again worried by the presence of this beetle in the house. About two weeks after the new generation of beetles commence to emerge the first eggs are found. The majority of these eggs are deposited promiscuously through the soil from one-half to three inches below the surface and extending from close about the crown out in a radius as great as that covered by the foliage of the plant. Later in the season, as the soil dries out, eggs are deposited about the central growing whorl of the crown, usually well down among the sheaths. They are also found in cracks and crevices frequented by the beetles and in the tunnels that sometimes occur about the base of the plants. The largest number of eggs deposited by a female in confinement was 43. In dissections, eggs were found in numbers from 23 to 67, with an average of 42. It is believed that the average egg production is higher than this, however. The egg period in the field extends over a period of several weeks. The beetles themselves feed at night and during the day crowd down in dark sheltered places. They will often be found in numbers under a clod, in a crevice or crack in the soil, in these tunnels mentioned above, or crowded down about the crown of the plant itself.

The eggs begin hatching in about nine days; in our observation the incubation period was from nine to 24 days, with an average of about 14 days. The egg is comparatively hardy, will stand considerable handling and jostling about and, unlike the egg of many insects, will hatch even in dry soil. The egg-laying period extends apparently well into the season, at least until July 20. By far the majority of the eggs are deposited, however, during June. The young grubs are fairly hardy and active. They can live in dry soil for 36 hours without food and can travel over loose dry soil at the rate of eight inches in 16 hours.

Control Measures

In spite of a great amount of careful and conscientious investigation, particularly in Canada and in Oregon, no really practical and satisfactory remedial measures have been developed.

Barrier Method—Taking into account the inability of the beetles to fly, we conceived the idea of a barrier about the newly set fields to keep them out. The barrier used consisted of 12-inch boards placed on edge about the field, well braced from the inside, all the joints carefully fitted and made insect proof. A strip of tin was tacked along the top edge of the fence projecting out over the edge of the board about one and one-half inches.

The barrier proved reasonably effective in excluding the weevils, and though the cost of construction is considerable, the idea is not impracticable. The plan has never proved popular with the growers, and none, so far as we are aware, have adopted this system.

One Crop Rotation—The most successful plan and the one recommended by Canadian workers and ourselves as apparently the only one at present feasible, is the growing of the plants only one full-crop year and then destroying the field immediately after the harvesting of the main berry crop.

In our common practice of planting in the spring and cultivating the first season; take one crop of berries the second spring and plow up the fields just as soon as the berries are off. The soil should be worked up well or stirred frequently, and strawberries should not be planted on the ground for two seasons.

Spraying with arsenicals has been tried. The beetles feed but sparingly and apparently avoid sprayed foliage. No success has followed this treatment.

New Plants should by all means be obtained from uninfested sections. Where obtained from a suspicious district, the plants and containers should be handled with caution and examined carefully for weevils. Previous to planting, dip the plants in a tobacco solution consisting of Black Leaf 40, four tablespoonsful; soap, one-fourth pound; dissolved in five gallons of water.

Allied Species of Weevil Found on Strawberry

Two allied species of weevils have been found infesting strawberries in Oregon. The larger weevil (Otiorhynchus sulcatus) (See Plate —, Fig. 9.) occurs about everywhere that O. ovatus does. It apparently does not spread rapidly nor multiply fast enough to injure the field to a noticeable extent. It is apparently a more serious pest of greenhouses, being particularly serious on cyclamen, begonias and similar potted plants.

Otiorhynchus rugifrons (See Plate —, Fig. 8) is apparently very limited in its range. The only serious infestation at present known is in the Oswego section south of Portland. The weevils have been observed in the Gresham section, but no heavy damage directly traceable to them is known in this neighborhood. In the Oswego section there are many of the growers who have given up strawberry culture entirely, and others report most discouraging prospects where this pest is present. In a great many cases the fields were so severely injured the second season that a full crop was not realized. This beetle is slightly larger than ovatus, more prolific and may prove a worse strawberry pest than its dreaded ally. No especial study of these species has so far been made in Oregon. It would seem that the same remedial measures would apply as for ovatus.

STRAWBERRY CROWN MINER

(Aristotellia abscondetella)

This strawberry crown miner is present in the State of Oregon about everywhere that the strawberry is grown. In many localities fields have been observed which were severely injured, and an examination showed this pest to be wholly responsible for this trouble.

While the names of these various insects infesting the strawberry roots may at first appear confusing, the injury each does and the appearance of the larvae are distinctive. The larvae are not grub-like, but are longer, more slender, of a distinct reddish color and with a brown head. When mature they are less than half an inch in length. They feed almost entirely within the crown, usually mining just within the bark, constructing long tunnels either up and down or around the crown. Others tunnel directly through the crown or else up and down the cork-like interior of the root. Still other larvae are found feeding in the whorl of leaves at the growing tip of the crown, and a few have been observed mining in the petiole of the leaves.

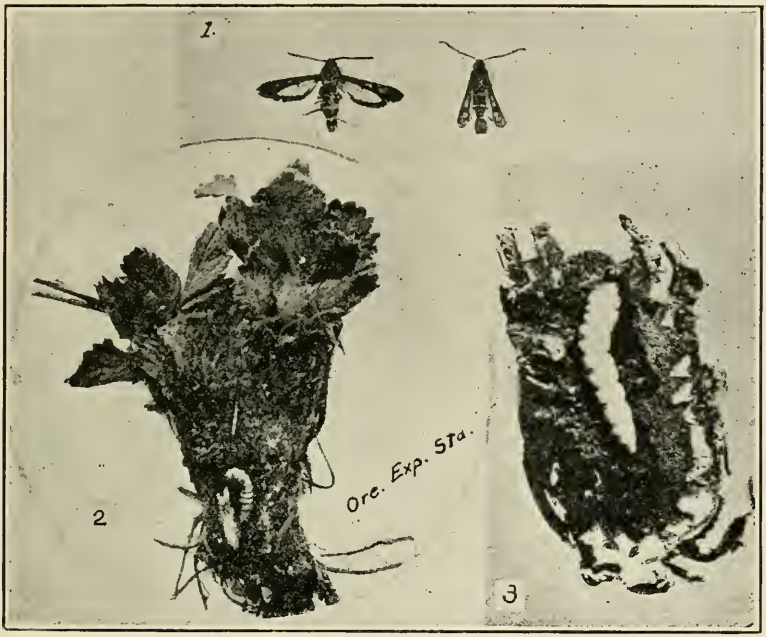


FIG. —. STRAWBERRY ROOT BORER (SESIA RUTILANS)
1. Adult moths. 2. Strawberry plant showing larva. 3. Larva in its burrow in the root. (Original.)

The adult of this crown miner is a small moth, resembling very closely in general appearance the peach twig miner, Anarsia lineatella. It is a weak flyer and very sluggish in its movements. The eggs are deposited on the sheaths about the crown, on the underside of the leaves, and along the leaf petioles. They are usually pushed well down among the fine hairs. The egg is white with a dull lustre, a slight area at the smaller end being transparent. The surface of the egg is ribbed and pitted, very much resembling the hull of a peanut. The egg is elongate, flattened at the larger end, the edges rounded. From the base end it gradually increases in size to near the middle, then slopes down to a blunt rounded point. It measures .55 mm. long and .29 mm. wide.

Remedial Measures

Plowing up the infested plants is the method of treatment recommended.

It would seem that possibly the young larvae on hatching from the egg might feed on the leaf or petiole before entering the crown and could be successfully poisoned with an arsenical spray.

THE STRAWBERRY ROOT BORER

(Sesia rutilans Hy. Edw.)

This root borer is a serious pest of the strawberry, occurring in the State of Oregon nearly everywhere the strawberry is grown. The elongate white larva, with brown head and darker biting jaws, feeds on the interior of the crown and tap root of the strawberry plant, eating out the entire heart. The plant, as a result, looks sickly and, when pulled up, will often break just below the crown, exposing the tunnel filled with frass and excrement, and often the larva itself. The adult insects are clear-winged moths.

Remedial Measures

Dig up and destroy infested plants, preferably in late fall or early spring.

STRAWBERRY CULTURE EXTENDS THROUGH STATE

Oregon Growers Produced Five Per Cent of Total Tonnage in America During 1919, for Which They Received $1,000,000, Highest Returns Ever Recorded Here

By W. H. Walton, Editor Better Fruit

Of the bush fruits, the strawberry, until the last year, was the largest income producer in Oregon, but the heavy planting of loganberries has now pushed it back into second place. The fame of Oregon as a strawberry-producing state has largely rested on the Clark seedling, produced so extensively in the Hood River Valley and, to some extent, in other sections of the State. This berry, which has no superior as a shipper, has been sold successfully all over the Middle West when marketing conditions made it necessary and has widely advertised Oregon and its strawberries.

From now on, however, the reputation of Oregon as a strawberry-producing state will not be confined to the limited area in the Hood River Valley, as the erection of canning and processing plants throughout the State is causing extensive plantings in Western Oregon, and thousands of pounds of this fruit, canned and put up in the form of jams and jellies, will be shipped to all parts of the world.

In 1919, Oregon produced about five per cent of the total tonnage of strawberries grown in the United States, for which the growers received in the neighborhood of $1,000,000. Of this amount, the Hood River district, which shipped over 100 cars, received $300,000; in fact, the net returns to the growers this year were the highest ever known in the history of the industry. The other large producing districts were Western and Southern Oregon and those parts of Eastern Oregon where there is irrigation or the rainfall is not too light to prevent the fruit from maturing.

While great success has been achieved in producing strawberries in the Hood River district, the big development in this industry in the future will be in the Willamette Valley and other sections of Western Oregon, where the soil and climate are particularly adapted to the propagation of this berry, and where fixed markets have been made for it by establishing canneries at most of the central points in this territory, such as Salem, Albany, Roseburg and Eugene.

Growing Area Extends

In fact, the creation of cooperative marketing organizations and the erection of processing plants, coupled with profitable returns, is stimulating the bush fruit industry to such an extent that Clatsop, Coos and other counties in the western and southern parts of the state, that heretofore have grown a limited quantity of

strawberries, are now entering the industry and will be heavy producers in the near future. This year, the demand for this popular fruit at the highest prices ever known was far greater than the supply, and no shipment was too small to attract the buyer.

Planted on the right kind of soil and given reasonable care, the strawberry grows to a perfection in both quality and yield in Oregon not excelled elsewhere. There are many hundreds of acres of the bench lands of Western Oregon that can be purchased at a reasonable figure, that present fine opportunities for the prospective strawberry grower. Distance from market, which was formerly a bar to raising berries in many of these sections, is no longer much of a factor, having been overcome by the introduction of motor trucks, many of which are now operated by the purchasers of the fruit and call daily at the grower's patch for the berries.

The varieties of strawberries that have been the most widely raised in the Eastern Oregon district are the Marshall and Wilson. The Marshall is a mid-season berry of fine quality, not a very good shipper, and is therefore largely consumed in local markets. The Wilson, which should be grown on rich soils, is a fine canning berry and, given care, is one of the heaviest producers. The Magoon, Gold Dollar and Oregon are some of the other important varieties that are being successfully produced in the western section of the state.

Some of the long-fruiting varieties are now being recommended for this section where canneries are located, and a considerable planting of these everbearing varieties is expected to take place next spring. East of the Cascades, the Clark Seedling, which is both a superior shipping and canning berry, is grown almost to the exclusion of any other strawberry. Here it thrives and brings rich returns to the grower, although not such a heavy producer as some of the varieties grown in the western section of the State.

Like the other bush fruits, the strawberry at the present time offers a fine opportunity for an investment in fruit raising in Oregon. With new markets, stabilized prices, and only limited capital necessary, the careful grower should get big returns.

THE CRANBERRY INDUSTRY IN OREGON

By W. E. Schimpff

While the cranberry industry in Clatsop County is comparatively new, yet cranberry culture on the Pacific Coast began about 35 years ago. Hector McFarlin, an old-time Cape Cod cranberry grower, came to the Pacific Coast and established himself at Coos Bay, Oregon, where he set out a five-acre marsh. McFarlin lived from the fruits of this acreage until his death, and always spoke of himself as a cranberry grower, and never as a farmer. About this same time, A. Chabot set out a cranberry marsh of considerable acreage in Pacific County, Washington. Chabot died before his marsh came into bearing, and after his death no real effort was made to keep up the same. Although, today, the old marsh is badly overgrown with weeds and grasses, the cranberry vines, which were planted 35 years ago, still thrive and bear some fruit.

We might even go further back in the history of this section and find that cranberries had some value as a commercial product. Lewis and Clark found cranberries at the Indian village of Wishrau, at the Falls of the Columbia River, according to the journal of Patrick Gass, one of the members of the party. Continuing their journey down this mighty stream to its mouth, on the first visit of the Indians to trade with them, Lewis and Clark purchased cranberries from these primitive people. Mention is often made of this little fruit in the diary of the intrepid explorers, and with elk meat, deer and other game, must have helped in making their stay at the mouth of the river quite enjoyable. While the

CRANBERRY BOG—GATHERING TIME—NEAR SEASIDE, OREGON—NOTE THE LINES FOR EACH PICKER

principal article of commerce of the Indians of this vicinity was salmon, the fact that cranberries were seen by the great pathfinders at Wishrau seems to prove that this fruit was a factor of some importance in the primitive commerce of the natives.

After the settlement of Clatsop Plains by Americans, while cranberries were picked in the nearby marshes and sent to California markets, there was a ready demand for this fruit in our neighboring state. The marshes were considered one great common, and whosoever wanted cranberries helped himself. The development of the industry in Cape Cod and the improvement of the quality of the eastern pack worked a hardship on the primitive methods used by Coast cranberry pickers and shippers, and a trade which had been established with California was lost to the East.

The real impetus to the cranberry industry in this section came about 1910; at this time an 80-acre marsh was set out to vines at Seaview, Washington. From Cape Cod came H. M. Williams, a descendant of an old Massachusetts cranberry family, and under his direction about 200 acres of cranberry marsh was set out, near Ilwaco, Washington. In 1911, C. N. Bennett and associates began operations for the construction of a good-sized bog in Clatsop County, Oregon. This venture was under the direction of D. M. Rezin, a former Wisconsin cranberry grower. Rezin left the Wisconsin country because of the uncertainty of its crops. He first settled in the Coos Bay, Oregon region, where his marsh adjoined that of McFarlin, and, during the later years of McFarlin's life, Rezin managed the McFarlin marsh. The construction of the Coos Bay railroad cut the Rezin marsh into bits, so Mr. Rezin came to Clatsop County and engaged in the cranberry industry here, where he is now busily occupied.

I will speak more particularly of the culture of this little berry in Clatsop County, inasmuch as it is in Oregon. The principal tract of bog land in Clatsop County lies along the right of way of S. P. & S. railway, about 11 miles south of Astoria. It extends to the eastward about a quarter of a mile, being bound on that side of Cullaby Lake and Cullaby Creek. The soil is a deep peat bog; wild cranberries grow therein in profusion. About 15 years ago, Clark Carnahan built Cullaby Ditch, connecting the waters of Cullaby Lake with the Skipanon, a tributary of the Columbia. The purpose of this construction was to bring logs from the Cullaby Lake district to the mills of the Columbia River. The cutting of this district drained the marsh lands, and they were later used for pasturage. Nothing was done in the way of cranberry development until C. N. Bennett came into the field.

All conditions seem to be met here. The mouth of the Columbia is one of the greatest frost-free zones in the world. We have a long growing season and a generous rainfall, combined with bright, sunny and warm days in summer; no real hot days come to this section. All economic plants show preference as to general conditions as, for instance, soil, climate, etc. None is more exacting in this respect than the cranberry. Given ideal conditions, it thrives and yields bountifully, but under less favorable conditions it will not reward the grower for his trouble; certainly not for his expense.

The home of the cranberry is generally regarded as Cape Cod, Massachusetts. It is from this district that most of the ideas concerning the cultivation of cranberries originated. It may interest you to know that the leading authority on cranberries in that state and, for that matter, in the United States, Dr. H. J. Franklin, in a bulletin of the Massachusetts Agricultural College, states that in but one place in the United States is the Cape Cod production of cranberries exceeded, and that section is the district at the mouth of the Columbia River. The average yield for an acre of cranberries in Massachusetts, according to Dr. Franklin, is 30 barrels. The yield in Clatsop County for 1918 was in excess of 3,000 barrels, and the producing acreage less than 100. The first crop in this county already equals the crop per acre at Cape Cod.

To the rule that berries thrive better in Oregon than elsewhere, the cranberry is no exception. Records of 100 barrels to the acre are not uncommon in the region of the mouth of the Columbia River, and crops of greater figures than this had been picked from marshes. Last year at the Dellmoor Bog, Clatsop County, one acre of marsh yielded 135 barrels of cranberries. The best record made for Oregon of which we have any knowledge was made at the McFarlin marsh at Coos Bay in 1908, when his five-acre tract yielded a crop of 1,000 barrels. One small patch of berries that seem to be bearing a particularly heavy crop was measured off, and the number of boxes picked from the same counted. This piece measured 10x16 feet, and its yield was an even six boxes. Had the crop been uniformly as large over an entire acre as over the small piece, we would have had a total of 1,633 boxes for an acre; or, reduced to barrels, 544 barrels. While it is hardly to be expected that this record could be maintained for one acre, when one remembers that a barrel of cranberries weighs 100 pounds, we can see that a yield of 100 barrels per acre means a crop weighing five tons. This, we must admit, is some crop in avoirdupois. Even a potato patch would be proud of it.

While there are cranberry experiment stations in several of the states, it is a fact that can hardly be disputed that there is still much to be learned about the cranberry. This little fruit is so entirely different in almost every particular that the fruit grower who visits a cranberry bog for the first time is impressed with the strangeness of the whole atmosphere about a cranberry bog. All of our agricultural and horticultural knowledge has come from plants which are grown on alkaline soils, and while a general knowledge of horticulture would be of some benefit to a horticulturist should he be transferred to another line of horticulture from that in which he is engaged, we would have to qualify this statement by saying that he would readily adapt himself to other lines of horticulture, unless he engaged in cranberry culture; when that fact would be impressed upon him every day, that here is a line of horticulture which is really entirely different. The very fact that it is grown in an acid soil makes its study, while fascinating in the extreme, a most difficult one. It would seem almost as though we are dealing with a plant belonging to some bygone age of geology. It interests us much as the study of life in the middle ages interests a student of history, or a journey through China, the traveler. It seems to be at the very extreme of all that we know about the ordinary fruits of commerce, just as life in the middle ages or in China today seems to us to be quite impossible to us in America.

Commercially, the cranberry is far from being insignificant. The production in the United States being between 500,000 and 600,000 barrels annually. Reduced to a per capita consumption, this is but one pint per capita. There is no question but that this can easily be increased, so the prospective cranberry grower need have no fear of an overproduction for many years to come. In fact, the increase in production of cranberries in the United States is hardly keeping pace with the increase in population. Wisconsin was at one time the greatest cranberry producing state in the Union; today, it ranks third, being outranked by Massachusetts and New Jersey. You can readily grasp the possibilities of the industry on the Pacific Coast. Today, we are unable to supply the needs of the Coast, and with increased production, it is more than likely that increased consumption will keep pace with production, and we shall hardly be able to take care of more than the needs of the Pacific Coast's growing population.

The Pacific Coast seems to be especially favored in having a mild climate combined with a generous rainfall. Next in importance to climate is sand and water. Sand is used in modern construction methods on all clean-culture bogs. Drainage is a very important essential. Here in Clatsop County, proper drainage was created at the time of the construction of Cullably Ditch. The waters of Cullaby Lake furnish an unlimited supply of water for the needs of the cranberry grower, whenever he feels that he wants to use it. A pumping plant capable of pumping 5,000 gallons of water per minute on the marsh has been installed by

one of the growers in this country. This plant is more in the nature of an insurance policy, and it is quite possible that its services may not be used for an entire season. With it, however, the grower feels that should he desire to flood or irrigate, he may do so at any time.

Next in importance to the natural requirements, all of which Clatsop County possesses, are commercial requirements. First in importance of these is transportation. The cultivated bogs of this county all border the main line of the S. P. & S. Railway, and but a stone's throw distant is the western end of the Columbia River Highway, paved for most of the distance between Astoria and Seaside. Its products have the best of opportunity to get to markets readily, as the common point for Astoria means not only for all products coming into Astoria, but for all products going out as well; this includes cranberries. Astoria and Seaside are two cities from which labor can be drawn, and even Portland is but a half day's journey from the bogs. The power lines of the Pacific Power and Light Company run along the highway between Astoria and Seaside, and it is from this line that growers some day expect to receive power and light.

Of particular importance is the fact that the bogs are right on the line of the railroad, as this means that the growers construct their packing houses directly at the right of way of the transportation company. There is no hauling cost to the railway. The packing houses act both as storage houses and as packing houses as well. The cranberry is one of the fruits that is not sent to the market immediately upon its being harvested. For this reason, particular attention is being paid to storage and packing houses; and for this reason, splendid packing houses are being built. One of the most modern and complete cranberry packing houses is now nearing completion in this county. It is of hollow tile construction, the floors are of so-called mill construction, having ventilated spaces through which cool air can be sent through the berries at any time the grower feels it necessary. The openings in the storage floor are so arranged that every tier of storage boxes has at least one opening under the tier, gratings through the lower of packing house floor permit the cool air from underneath the building to be rushed through the berries at night, ventilators on the roof of the warehouse furnishing the pull for the air.

The growers of this county have an association to which every grower, with but one exception, belongs. This association in turn belongs to the Pacific Cranberry Exchange, which markets the cranberries. The Pacific Cranberry Exchange is composed of the Oregon association, acting with several Washington associaitons. While it is a young organization, it may interest you to know that last year, when but one year old, it embarked upon an advertising campaign which helped materially in selling its product last fall, when conditions were really most adverse, on account of the sugar restrictions in effect at that time.

ORCHARD FERTILIZING—PROFITABLE OR OTHERWISE

By W. S. Brown, Chief in Horticulture

"Shall we fertilize our orchards?" is a question that can only be answered by answering two more. First, can the trees and crops in our orchards be improved? and second, how can they be bettered? If one can intelligently answer these two latter questions, he is then in shape to decide whether fertilizing will pay him, or not.

Unless young trees are planted on soil much depleted by long cropping, or upon such soils that are absolutely worthless for orchard lands, trees very seldom need any stimulation of growth before they are from five to eight years old and ready to begin bearing well. Consequently, in this discussion, we are chiefly interested in the bearing tree.

The first question we must ask ourselves then is, what constitutes a vigorous tree in a condition right for maximum production? Investigations carried on in recent years, chiefly at the Experiment Station of the Oregon Agricultural College, lead us to believe that the reason for maximum production lies deep down in the food supply of the tree. In other words, we have found in our investigations that wood growth and satisfactory bearing come only when there is a proper balance between the nitrogen and carbohydrates in the tree. (By carbohydrates we mean such compounds as sugar, starch, cellulose, etc., manufactured by leaves of plants by using CO_2, and through the agency of sunlight working upon the chlorophyll of the leaves.)

Dr. E. J. Kraus, formerly of the Oregon Agricultural College, and Dr. Kraybill worked upon this problem of the nitrogen-carbohydrate ratio; *the results of their work being published in Station Bulletin No. 149 of the Oregon Agricultural College Experiment Station. Dr. E. M. Harvey, who has succeeded Dr. Kraus in the field of research, and Mr. A. E. Murneek, his assistant, are continuing along this same line of investigation, amplifying it more and more to meet the problems of the fruitgrower.

To sum up briefly the meaning of the nitrogen-carbohydrate theory, and to show the influence of the proper balance between the nitrogen and carbohydrates, the following four conditions of growth may be noted:

1. N+C. Nitrogen plentiful plus carbohydrates very limited. Result, no growth to the tree and no fruit. This condition is not found except in pot experiments where factors can be absolutely controlled.

2. N+C. Nitrogen abundant plus carbohydrates abundant. Exuberant growth, bringing the tree into bearing late; little fruit. This is a condition usually found upon young trees before they come into bearing.

3. N+C. Nitrogen slightly limited plus abundant carbohydrates results in a fair growth to the tree and in heavy bearing. This condition is found in practically all of our best cared-for orchards that are showing vigor and regular bearing.

4. N+C. Nitrogen limited plus carbohydrates abundant is shown by small growth of wood, weak fruit buds and little fruit. It is an easy matter for orchards that have been in bearing for some time to gradually change from condition three to condition four.

How may the orchardist discover whether his trees are in the proper condition of balance or not? In a recent bulletin† by Roberts of Wisconsin, we find that he establishes a correlation between regular annual bearing and the length of fruit spur growth. He divides fruit spurs into four classes based upon length and performance. These classess, of course, blend more or less into each other.

1. An unfruitful fruit spur—about one-eighth of an inch annual growth on the average.

2. Spurs that blossom but do not set fruit—average annual growth three-sixteenths of an inch.

3. Spurs setting fruit—average annual growth one-half inch.

4. Long spurs producing only leaf buds—average annual growth three-fourths of an inch and over.

It should be understood at this point that Roberts was working on the Wealthy apple chiefly, and other apples may differ somewhat from this in actual measurements, though the principles are exactly the same. Roberts found that the long spurs are so well supplied with nitrogen and grow so fast that the leaves are spread over such a wide distance as to make it impossible for them to supply the spur with sufficient carbohydrates for fruit production. On the spurs in class three, while the spur is considerably shorter, more leaves are concentrated near the point where the fruit is to be formed, and consequently more carbohydrates

*Vegetation and Reproduction with Special Reference to the Tomato.
†Wisconsin Bulletin No. 317: Off-year Apple Bearing.

are deposited in this region. Experiments at our experiment station carried on in defoliating spurs act much in the same way. In other words, those spurs which have had their leaves taken off have lost the proper nitrogen-carbohydrate balance, and the spur starts to elongate but sets no fruit bud if the leaves have been removed early in the season. Dense shading of the spurs accomplishes much the same results, because we know that sunlight is necessary to stimulate the growth of the leaves and to enable the leaves to manufacture large amounts of carbohydrate materials.

Another correlation noted by Roberts was between the amount of the wood growth on terminal twigs and the bearing habit of the tree. He found

1. That terminal wood growths of eighteen inches and more in length usually indicated an unfruitful tree except in trees just coming nicely into bearing.

2. Terminal growths of from twelve to eighteen inches seemed to indicate a good balance between nitrogen and carbohydrates, and a production of fruit which was abundant and regular.

3. Growths from six to twelve inches frequently meant good crops; fairly regular, but in some cases the crops tended to be rather heavy one year and light the next; or what we call "alternate bearing."

4. Terminal growths of four or five inches invariably meant weak fruit spurs and poor crops.

To sum up the findings of Roberts, fruitfulness and regularity of bearing depends: first, upon a vigorous but not too vigorous growth of wood and fruit spurs; and second, upon a plentiful supply of fruit spurs especially upon two year old wood, so that if each spur shall bear as often as once in three years there will be a good crop.

Now comes the second question, how can we bring about this proper balance between the nitrogen and carbohydrate factors? In looking the matter over carefully, we see that this is not accomplished in any single way, that there are many limiting factors to growth and production. I wish to take up briefly a few of these factors before considering the matter of fertilizers. In the first place, if a grower is to suceed in his orchard, whether it be with apples, pears, peaches or prunes, he must be located in a climate that is suited to the production of these fruits, upon soils that are naturally adapted to the various fruits he has in mind, upon exposures that will not allow his fruit to be dried out if he is growing berries or something of that sort, or where his fruit will not suffer from late frosts in the spring, cold winds, etc. The water drainage must be good or artificial drainage must be possible.

The above factors, every fruit grower is inclined to take for granted. Several others, however, are distinctly limiting in the growth of trees and the production of fruit. Pruning is one of the most important of these factors. After many experiments we have found it axiomatic in pruning that the greatest stimulus in pruning comes in the immediate vicinity of the cut. Bearing this in mind we find that the type of cutting that seems to have the greatest influence upon the formation of strong fruit buds is one that cuts out many of the small twigs and branches but does not disturb the larger branches. In doing this the light is allowed to reach the small twigs and fruit spurs and carbohydrates are manufactured to a much greater extent than in dense shade.

One phase of pruning that has been overlooked to a large extent in most orchards, is that of spur pruning. This applies to prunes as well as to apples and pears. Trees when older tend to load themselves up with so many spurs and so much spur wood that they do not have vitality enough to set fruit upon these spurs very often. In such cases the trees can be stimulated into fruitfulness by pruning of some spurs entirely, and in other cases by cutting off branches of compound spurs. This is done in the prune by cutting out many of the little twigs that bear fruit spurs and allowing the light to enter to those left. Cutting out occasional branches of fair size in the tops allows the sunlight to penetrate the

tree, and is much better practice than to trim off so much wood at the bottom. Proper pruning, then tends toward better wood growth and greater fruitfulness.

Cultivation. This operation first of all warms the soil in the spring so that nitrifying bacteria may start their work early and supply the trees with that element which it needs most at the time; namely, nitrogen. Cultivation sets free plant food by breaking up large soil particles into smaller ones and allowing the smaller particles to become surrounded by film moisture. This moisture acts as a solvent and carries the mineral elements needed for the growth of the tree to parts above.

Irrigation. Irrigation is absolutely necessary under arid conditions. The water supply acts chiefly as a solvent and takes away that amount of food which is immediately available to the upper parts of the tree. It is readily seen then that irrigation can not take the place of cultivation; in fact, if cultivation is neglected, the soil may become cold and soggy after irrigation and spring growth be actually retarded.

Insect and Fungous Pests. It is well known that the presence of San Jose scale upon fruit trees will, in a short time, deplete their vigor to such an extent that they are no longer fruitful. If the pest is left too long, the tree itself may die. Apple tree anthracnose, crown gall and numerous other troubles may devitalize our trees.

Cover Crops. These crops should be plowed under at the ordinary time of plowing in the spring and before they deplete the moisture in the soil. Perhaps their greatest function lies in keeping the soil well supplied with humus. Humus adds directly to the water holding capacity of the soil, furnishes more air spaces in the soil and thus aids in warming it. With water and warmth, nitrifying bacteria become active and nitrification takes place early in the season. It has been frequently noticed by prune growers especially, that early plowing, on soils that will permit it, combined with cover crops, favors the setting of large crops. Again, certain kinds of cover crops, such as the legumes, afford us our cheapest supply of nitrogen. Common vetch (Vicia satvia) contains 3.1 per cent of nitrogen in its dry matter. It may be stated here that a ton of vetch ordinarily cured will contain about 1,500 pounds of dry matter or 45 pounds of nitrogen. This is equal to an application of 300 pounds of nitrate of soda.

Fertilizers. It is evident then that fertilizer is only one of the limiting factors needed to produce good crops of fruit and is not a cure-all by any means. In orchard management, a fertilizer is indicated only when other limiting factors are brought up to par, and still the tree appears to lack vigor and refuses to bear well and regularly. Because orchards seem to flourish year after year without any fertilizers being applied or without very much care, it is thought by some that the orchard does not deplete the fertility of the soil. Such, however, is not the case. The trees use up a great deal of plant food but get this by foraging widely and deeply. Some observations by Dean I. P. Roberts, formerly of Cornell, substantiate this point. He found that an orchard of mature trees between the ages of 13 and 33 years used from the soil in making the roots, trunks, branches, leaves and fruits, 1,336 pounds of nitrogen, 310 pounds phosphoric acid and 1,895 pounds of potash. That the fertility taken out of the soil by a wheat crop, both grain and straw, in comparison for a period of twenty years, amounted to 425 pounds of nitrogen, 160 pounds of phosphoric acid and 110 pounds of potash. This was estimated on a basis of a yield of 15 bushels to the acre of wheat and 7 pounds of straw to every three pounds of grain.

Notwithstanding this heavy depletion of fertility by the orchards, we have eastern state experiment stations including those of Geneva, Pennsylvania, New Hampshire, New Jersey and others, that have been experimenting with fertilizers, and they have found that fertilizing with potash and phosphoric acid very seldom pays for the cost of handling the fertilizers, and sometimes there are

no favorable results whatever. With nitrogen, however, the results are different. They have found in all their experiments that nitrogen is the element that most quickly wears out in the soil and that trees respond to this element more readily than to anything else, as a rule.

The results of fertilizing experiments in the west bear out the conclusions obtained in the east. The Oregon Agricultural Experiment Station started an experiment at Hood River in the year 1914 upon apple trees. These results are to be found in Bulletin No. 141 beginning on page 37. To quote from the introduction of the article written by C. I. Lewis, we find the following: "The results of two years work previous to 1916, indicated no response of a practical nature by use of potash or phosphoric acid. On the other hand encouraging results were secured from introduction of nitrogen." These experiments were carried on for three years. From 5.2 to 6.7 pounds of nitrate of soda were used to the tree. The orchards were 19 and 12 years of age at the time of beginning. The results obtained were as follows: Leaf and terminal growth two to four times as much as growth of check plot; yields one and one-half to four times as much as found on the check trees. The fruit buds were more vigorous and the results were reflected in the next year's crop. Color was less brilliant on some of the highly colored apples after two or three heavy appliances of fertilizer. Size of Fruit.—Nitrate increased the size of fruit greatly on the treated orchards. Maturity of Crop.—Check trees seemed to mature their fruit somewhat ealier than the fruit matured on the treated trees.

Prunes. Experiments were begun in fertilizing prunes in the spring of 1918 and have continued since. Judging from our experience with apples and from the experience of the eastern growers, we did not feel that applications of phosphoric acid and potash would be of value, and so have confined the fertilizer trials to some form of nitrogen-carrying fertilizers such as nitrate of soda or sulphate of ammonia. Nitrate of soda is the fertilizer meant in this work unless otherwise stated. The fertilizer was applied early in the spring about the first of March or the latter part of February in order that the salt might be disolved and washed down into the roots by the rains. The salt was scattered broadcast over a strip four to five feet wide underneath the outer branches and beyond them, because the feeding roots of the trees are usually found in this vicinity for the most part. From 3½ to 5 pounds of nitrate was applied per tree, depending upon the age of the tree and its size and vigor. Usually five pounds was considered a reasonable application for trees mature and of good size.

The results of these applications differed somewhat in orchards that have had different treatments. For orchards that had enjoyed good care and had not been run down, we find that the terminal shoots were increased from one and one-half to two times over the terminals of the check trees, that the color of the foliage was greener, was more leathery in texture, and less inclined to curl up in the summer time. The size of fruit was increased somewhat both in the fresh and dried stages. The drying time for fruit was the same for the treated and untreated trees. The maturity of the crop came from a week to ten days later with the treated trees than with those untreated.

In old, badly run down orchards we found much the same conditions obtained as have been noted above, except there was a much more pronounced gain in yield amounting to as much as 33½ per cent in some cases, while the increase in size of fruit came up to an average of 10 per cent. The maturity of the fruit was delayed fully ten days in most cases. Whether this is going to be detrimental or not, remains to be seen. Some growers believe that under ordinary natural conditions, the later maturity would throw prune harvesting too late to be safe.

Some work was done on pears during the summer of 1919, but there were not enough funds available to follow this up. Some observations made on varieties fertilized at that time show us that there seems to be some benefit derived especially upon the fruit buds the following year.

Red raspberries on one large plantation at Brownsville, fertilized at a rate of 250 pounds to the acre. Great care was taken not to allow the salt to touch any of the young plants which were just coming up at the time of application early in the spring. As a result of the application in 1919, it was found that the leaves were larger and greener than those of the check plots, and that the berries were larger and had a better luster than the others. There seemed to be no objectionable softening of the fruit; perhaps a heavier application might result in such softening. Yields were increased by approximately ten per cent. The berry vines were hurt severely by the winter, however, which shows that under some soil and climatic conditions, nitrogen must be used with considerable caution if the wood is to mature properly for winter.

It would not be right to leave this subject of nitrogen fertilizer without a word of warning to the grower. There is a decided danger of applying quick acting fertilizers like nitrate of soda or sulphate of ammonia for too long a time. If large amounts are applied to trees for three or four years hand running, there is considerable danger that these trees may be started into a heavy wood growth at the expense of fruit production; in other words, that the tree may be thrown from condition No. 3 where nitrogen is slightly limited and carbohydrates abundant, over to condition No. 2 where nitrogen is abundant and carbohydrates also abundant with resulting unfruitfulness.

Possibly a few words should be said at this place regarding mixed fertilizers. The way these are usually applied indiscriminately forms one of the easiest ways of throwing away money that can be imagined. However, in all of our tests both in the east and in the west, we have found that the average orchard responds very little, if any, to applications of phosphoric acid and potash; then why spend good money for mixed fertilizers? If you care to find out exactly whether your trees need phosphoric acid or potash, make application of these elements and nitrogen on separate plots, and compare them with other plots of trees unfertilized. You can then judge for yourself what materials are needed.

FUNCTIONS OF THE STATE BOARD OF HORTICULTURE

By Henry E. Dosch

In order that it might be properly understood and give a reason for its existance it is necessary to begin at the beginning of fruit growing in Oregon.

When the pioneers in horticulture planted fruit trees and berry bushes, there were neither insects nor fungous diseases, and they were sure of healthy fruits and could eat apples and pears in the dark without running the risk of consuming worms, but in time insects and diseases appeared, growers became discouraged, fruit began to fall prematurely unfit for use, trees were neglected, grew into bushes, mossy and breeding places for all kinds of fruit and tree enemies.

The more progressive orchardists concluded that something had to be done if the fruit industry should live; a meeting was arranged by Dr. J. C. Cardwell, Dr. O. P. S. Plummer, S. A. Clarke, C. H. Welch, W. S. Failing, H. W. Prettyman, Chauncey Ball, C. E. Hoskins, Thos. Paulson, the Luellings, J. H. Lambert, M. Scheydecker, T. V. Sluman, myself and others whose names I can not recall, which was the nucleus for the Horticultural society, which was organized November 17, 1885, by electing Dr. Cardwell its president, an office he held for twenty years by continued reelection, O. P. S. Plummer, vice president, and E. R. Lake, secretary. By hard work and talk we succeeded in bringing together quite a number of growers, but we found it up-hill business, as few of us knew anything about insects or diseases, or their destruction and eradication, and also found that the majority of fruit growers were indifferent and careless and yet something had to be done. We then agreed to call on the State for

assistance, when a bill was introduced and approved February 25, 1889, which has been repeatedly amended up to date and this brings us to the topic assigned to me,

"The Functions of the State Board of Horticulture."

The Law Creating the Board:

An Act to create a State Board of Horticulture, and appropriating money therefore, is published in full in this report.

Be It Enacted by the Legislative Assembly of the State of Oregon:

Section 1. That there is hereby created a State Board of Horticulture, to consist of six members, who shall be appointed by the Governor, one from the State at large, and one from each of the five horticultural districts.

The following horticulturists were named by Governor Pennoyer to act on the Board: J. R. Cardwell, president, commissioner for the state at large, Portland; James A. Varney, inspector of fruit pests, commissioner for the 4th district, The Dalles; R. S. Wallace, treasurer, commissioner for the 2nd district, Salem; Henry E. Dosch, commissioner for the 1st district, Hillsdale; J. D. Whitman, commissioner for the 3rd district, Medford; James Hendershott, commissioner for the 5th district, Cove; E. W. Allen, secretary, 171 Second street, Portland.

Our first function was one of education in which we were quite successful; in my own district of seven counties, considering the limited funds at my disposal, I took my horse and buggy and traveled the highways and by-ways, stopping wherever I saw an orchard or even a few trees around a home place; old settled districts as well as new settlements, where with two exceptions I was received most cordially, and found fruit growers not only willing but eager to learn and redeem their orchards. Few of the orchardists knew anything of the insects and diseases. By way of illustration, permit me to quote a case in hand. My usual plan in visiting a neighborhood was going from orchard to orchard, so I could see the owners personally and persuade them to do their duty in this line. The case in question was up the valley, where I visited an old gentleman, who emphatically stated, that he had no insects in his orchard, and that if I insisted on going into his orchard he would take his shotgun and see who was master. Now as the law did not provide, that any of the commissioners should become targets for "mossbackism", I quietly handed him a copy of the law, referring to sections 7 and 8, requesting him to read it, which would explain his duty and mine. Having finished reading he became very angry saying, "they might as well pass a law to compel him to plow his fields", and I said "such a law would certainly prove very beneficial". He looked at me in blank astonishment, and I finally persuaded him to accompany me in a visit to his orchard, which he reluctantly did, all the time protesting that he had no insects and nobody could teach him anything about farming; when we rounded the barn and came in full view of his old dilapidated orchard I smiled, as it was so infected with wooly aphis that it had the appearance of having recently passed through a heavy snow storm, and had no difficulty in convincing him that the trees were full of insects by scraping the little brown insects from the trees in the palm of his hand, lively and kicking, when he exclaimed "Well, I swan". This man soon became a most enthusiastic supporter of the law.

This educational function has been continually kept up and the present state of our orchards with few exceptions shows the beneficial results.

The board made it its business to meet with every horticultural society meeting and took part and gave instruction as to the eradication of the insects and diseases, and published spray bulletins and reports for general distribution.

In addition to looking after orchards and berry patches, I took it upon myself to study market conditions, and wrote hundreds of letters to our consuls all over the world year after year where our fruits could be placed and published the results of this research so orchardists could take advantage of it from which

immense trade with England, France and Germany resulted, up to the world war, and will again be enlivened as soon as peace is fully settled.

To illustrate: A wideawake fruit grower from southern Oregon who had taken advantage of this research for markets sent a few boxes of apples to England by way of experiment in 1897, 23 years ago, and shortly after I received a letter from Hon. William Grunnell, American consul at Manchester, England, dated December 7, 1897, which said: "In a lot of apples received from Oregon and on sale in this city were found placards on which was printed 'Rogue River Valley apples from the orchard of C. Kleinhammer, Phoenix, Oregon' ", saying finer fruit had never been exhibited in that market and dealers wanted to secure the output for another year, which resulted in the shipping of 4,000 boxes the following year.

Another instance in 1903. A gentleman came to our office and presented his card, a Mr. Kruse. He proved to be a commission merchant from Hamburg, Germany, and said to me, that he was present when a car of apples was auctioned off and was one of the bidders. He was so impressed with the fine quality of these apples that he had come over in person to make arrangements for his future supply. This car had been sent by a commission house in Portland on information I furnished them received in reply from the consul at Hamburg.

These shipments were followed up very closely by various growers and developed so rapidly that in 1905 nearly the entire output of southern and eastern Oregon-grown Newtowns and Jonathans, some two hundred and thirty-five carloads, were shipped direct to England and Germany. These shipments were distributed as follows: To Liverpool, 120 cars or 72,000 boxes; to London, 45 cars or 27,000 boxes; to Glasgow, 8 cars or 4,800 boxes; to Manchester, 7 cars or 4,200 boxes; to Hamburg, 30 cars or 18,000 boxes; to various points, 25 cars or 15,000 boxes; a total of 235 cars or 141,000 boxes.

These apples netted the grower one dollar and fifty cents f. o. b. shipping station. While this was not a direct function of the Board yet my research proved to be of immense benefit to the fruit industry of Oregon.

Thousands of acres of fruits have been planted since our organization, most under our advice as to which sections are best adapted not only as to the kinds of either apples, pears, prunes, cherries or walnuts, but which sections were more congenial as to the variety, as to the soil and climatic conditions.

A very important function of the Board, which in itself is a police duty, is the quarantine we have established, by prohibiting the sale of any infected or infested fruits in our markets, either home grown or imported from other states, also inspection of nursery stock, either home grown or imported from other states, and now that we have been appointed collaborators of the Federal Horticultural Bureau, we are Government-Quarantine officers and inspectors of all kinds of fruit stocks, trees, shrubs and bulbs from without the United States, which in itself is a very important function to prevent the introduction of new insects of fungous diseases.

In the absence of an Agricultural Board the function devolved upon us the inspection of potatoes and alfalfa. The alfalfa weevil so prevalent in our neighboring state, especially Idaho, is a menace to our large alfalfa plantations, hence we quarantine against shipping into Oregon any alfalfa hay and strict orders have been issued at our request by railroad officials to their agents along their lines from receiving or delivering any hay from Idaho. Our commissioners and inspectors are particularly vigilant against California shipment of potatoes, on account of the tuber moth, eel worm, fusarian wilt and rhizoctonia; hundreds of car lots have been returned to California and some which were so badly infested with tuber moths had to be steamed and destroyed, for fear the moths would escape in return transit to California.

Permit me to quote from Mr. Allen's report, Commissioner of Southern Oregon:

"I think I may say without fear of contradiction that the work of the State

Board of Horticulture in this one matter of keeping the tuber moth out of the state of Oregon, has resulted in the saving of millions of dollars. The average grower, or in fact any one not entirely conversant with the subject, can hardly appreciate the extreme danger to the potato crop from this source. The rapidity with which the tuber moth multiplies is astounding. An experiment made in the pathologist's office in Jackson County with two tubers infested with the moth, showed how rapid the production was. In a comparatively short time, from these two tubers, over two hundred moth and larvae were hatched. If the State Board of Horticulture had done nothing else this item of preventing the introduction of the tuber moths would be sufficient to have paid thousands of times over for all the money spent by this organization."

A function which particularly applies to the secretary is in addition to soliciting books, pamphlets, periodicals and other documents containing valuable information relating to horticulture and preserve the same, actual conditions and progress of horticulture, etc., to answer all letters from within the state from growers, about insects and fungous disease, giving full information and advice, and from without the state inquiries about fruit growing, best sections adapted for various fruits, etc., which in itself is valuable as it acts as immigrative literature, bringing to our state many intelligent horticulturists.

We have also received many letters from other states for copies of our laws and quarantine, as well as modes of procedure and work by this Board which have been adopted verbatim by them with ten fold the amount of appropriation that is allowed to us, which speaks very well, as the highest compliment that can be paid to any one is the copy of his ways, actions and work.

The clean merchantable fruits, the remunerative prices received by the growers, the high plane and volume which our fruits have attained, second to no other industry, in our State, is undoubtedly the direct result of the fostering care and activity of the State Board of Horticulture.

Permit me to quote in part from the opening address of Honorable G. H. Hecke, Director of the Department of Agriculture of California and chairman of the Western Plant Quarantine Board, delivered at the meeting at Salt Lake City, Utah, May 11, 1920.

"To those in our Western states who would question the necessity and ultimate value of our plant quarantine work, I say, 'Lift your mental vision over the Rocky Mountains and consider the calamity that has overtaken the forests, farms and fields of the great territory that reaches to the Gulf of Mexico and to the broad Alantic, a part of our country that until very recently did not attempt to protect its crop producers by the exercise of proper inspection upon arrival and which now finds itself in the grip of several drastic federal quarantine regulations. There is the blister rust in the pine woods, gipsy moth, brown-tail moth and chestnutbark disease creating havoc in the hardwood forests, potato ward in Pennsylvania, cotton boll weevil busily at work in practically all the cotton fields, pink boll worm in Texas and Louisiana, European corn borer in Massachusetts, New Hampshire, New York and Pennsylvania, Japanese beetle in New Jersey and the Oriental peach moth well established in Massachusetts, New York, Connecticut, Pennsylvania, New Jersey, Delaware, Maryland, Virginia and the District of Columbia. All these are introduced crop pests, all constantly spreading causing onerous quarantine restrictions, necessitating enormous annual appropriations, and each season, every season, taking an increasing percentage of the growing crop and of the crop-producer's anticipated profits. No one of these dangerous crop destroyers is yet established west of the Rocky Mountains; no one can reach here through its own powers of locomotion; and it should be the fixed purpose of all plant producers, equally with all quarantine officers, to circumvent any attempt to assist in their migration.

"The formidable list just enumerated—all of which constitute a constant daily menace—should be a warrant for renewed efforts upon the part of the Western Plant Quarantine Board to prevent their introduction into our territory, and for an appeal to the legislative and commercial bodies of our several states for support and cooperation in this work of protection to our crops and prevention of the burdens of plant quarantines."

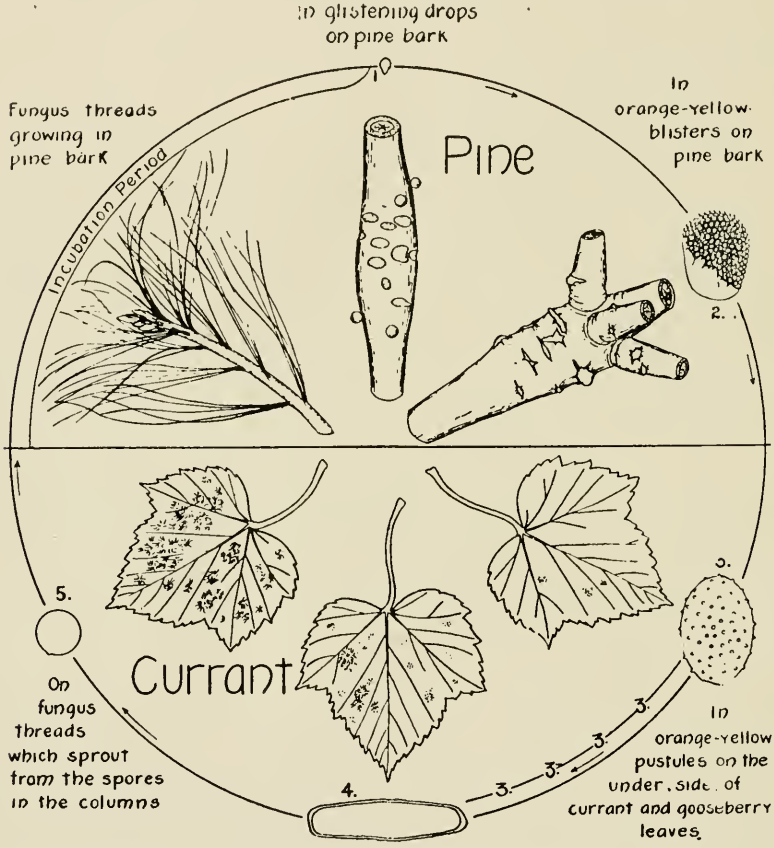


Figure 1. Life cycle of the White Pine Blister Rust. (Loaned by the courtesy of the Bureau of Plant Industry, U. S. Department of Agriculture.)

WHITE PINE BLISTER RUST WORK IN OREGON

George A. Root

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U. S. Department of Agriculture*

The White Pine Blister Rust (Cronartium ribicola) is a destructive disease of the so-called white pines, that is, those pines which bear their needles in bundles of five each. Due to its severity in Europe, it is impossible to grow white pines there with profit. It was introduced into northeastern America from Europe about fifteen years ago, on diseased nursery stock. Since then it has become firmly established in many of the most valuable white pine stands of New

*Western branch of the office of Blister Rust Control, in charge of Mr. G. B. Posey, is located in Berkeley, California.

England, New York and the Lake states. The damage which it annually causes to those forests is rapidly increasing, although it has not as yet become the menace that it is in Europe.

The White Pine Blister Rust

This disease is not an insect, as many erroneously suppose, but a plant disease which attacks all five-leaf pines. Fortunately this is a disease which like the wheat rust requires another host plant in order to complete its entire life. This host plant is some species of wild or cultivated currants and gooseberries (Ribes and Grossularia). (See Fig. 1.) This disease is one which affects the bark of the pine, producing large cankers which eventually kill young growth and maim and disfigure old trees by shutting off the supply of sap. In time there appear along the swelling of these cankers numerous white blisters, which eventually break open, disseminating orange-colored spores of a powdery nature. (See Fig. 2.) These may be noticed from April to the middle of June, and often later. The spores are blown far and wide by the wind, or carried by birds and insects. These spores can not reinfect pine, but should they happen to reach currants or gooseberries, the other stage of the disease is started on the leaf appearing on the underside as a rust. The spores produced on these leaves are also yellow or orange in color, and may re-infect other currant and gooseberry bushes enabling it to spread over a wide area. Later on there is produced another set of spores, brownish in color, which can only infect the pines. (See Fig. 3.) Thus the cycle is kept up indefinitely. The yellow, or summer stage, may be noticed on the leaves of wild and cultivated currants and gooseberries from June 1 to the fall of the leaves. The brown hair, or autumn stage (see Fig. 3) may be noticed about August 1, often occuring on the same leaves which are still bearing the summer stage. Specimens of the disease may be seen at the office of the Secretary of the State Board of Horticulture in Portland.

Special attention should be paid to the cultivated black currant, as this is the most susceptible variety. Some recent evidence by government pathologists shows that the disease can winter over on currant and gooseberry plants as well as on the white pines.

Methods of Control in the East

When the seriousness of this diseases in the United States was realized, state and federal authorities endeavored to stamp it out. But it had spread so rapidly over large areas that complete eradication was impractical. By completely eradicating the currants and gooseberries in and near a white pine forest the disease can be controlled. Due to the intensive forestry methods, and the fine stands of white pine in the eastern states, this method of control was found feasible. No spraying of any sort has been found advantageous in even controlling the disease.

The cost of control work on a quarter of a million acres in the New England states in 1920 averaged only 24 cents per acre. In some other states the cost exceeded $1.00 per acre but even much higher costs are insignificant compared to the income producing value of eastern pine. On this basis the production of white pine timber can be carried on profitably, in spite of the disease. But such control measures would be manifestly impractical in the West. Here the white pines occur over immense stretches of rough mountainous country, and as a small percentage of a mixed stand. Several species of wild currants and gooseberries are present in great abundance throughout these regions. These conditions would make it very difficult, if not impossible, to check the disease once it became firmly established in the western white pine and sugar forests.

White Pines in Oregon

The immense stands of white pine in the West are in danger of attack by this disease if ever the infection is carried this far. These stands contain a supply

of the finest timber marketable. Within the State of Oregon, the two chief species of white pine occur—the western white pine (Pinus monticola), and the sugar pine (Pinus lambertiana). The former occurs mostly in the central part of the Cascades while the latter occurs especially in the southern part being a continuation of the immense stands in California. The White bark pine (Pinus

Figure 2. White pine tree dying from the effects of the rust. Note the infection on the main trunk and side branches; also the blisters which have broken through the bark, which contain the spores which are carried to currant and gooseberry bushes. (Loaned by courtesy of the Bureau of Plant Industry, U. S. Department of Agriculture.)

albicaulis) occurs sparsely at higher altitudes, but is of no economic importance. Sugar pine is America's largest pine, and is one of the finest timber trees in the world. Approximately 11 billion feet occur in this state with an estimated value of $36,000,000. Western white pine, while not attaining the size of sugar pine,

grows much more extensively in the West as a whole, and its lumber has even a greater comparative value. The approximate number of feet of this species in Oregon is reckoned at 825,000 million with an estimated value of $2,887,500.

White pines are fast growin trees, and if the young trees are allowed to develop the annual growth will remain a large asset to the state. The introduction of White Pine Blister Rust would certainly mean that much of this young timber would never develop. Young white pine stands are readily killed out by this disease. Mature trees are greatly weakened, but in most cases may still be cut for timber. Constant loss of young growth would leave these great tracts with no future as white pine forests, after the mature stands had been cut.

Figure 3. Underside of black currant leaf, showing brown-hair or autumn stage of disease. (Loaned by the courtesy of the Bureau of Plant Industry, U. S. Department of Agriculture.)

Wild currants and gooseberries are abundant in Oregon, 30 species being known to occur within the state. They are plentiful throughout the mountainous regions, where the white pines are found, and would allow the disease to flourish there, if once introduced. They are also found in sufficient numbers in eastern Oregon to carry the disease to these pines, from any neighboring region.

Blister Rust Work in Oregon

During the past three years the Bureau of Plant Industry of the United States Department of Agriculture has worked to keep the western white pine forests free from the White Pine Blister Rust. A campaign has been conducted in all

of the western states along the following lines: (1) locating and inspecting every shipment of five-needled pines, currants, or gooseberries that is known to have entered this territory from a region where the disease was present. (2) Searching for violations of the Federal quarantine which was designed to protect the West from this disease. (3) General examination of the wild and cultivated white pines, currants and gooseberries to see if the disease was present. The purpose of this work was to locate and stamp out any trace of the disease which might be found, and to prevent by all means its introduction into the West.

Since the beginning of this work, thousands of imported pines, currants, and gooseberries have been inspected, and large areas of native white pines have been scouted. So far no evidence of the disease has been found in Oregon or any other of the western states.

The Oregon State Board of Horticulture, working in cooperation with the Bureau of Plant Industry, has intercepted and destroyed a number of shipments of potentially dangerous pines, currants, and gooseberries, which were entering Oregon.

Quarantine Enforcement

Results of extensive searching for the disease in the West indicate that it has not gained a foothold here. To keep it out requires the rigid enforcement of state and federal quarantine laws enacted for the purpose. These laws were made effective by the State of Oregon on June 1, 1917, and by the federal government on July 1, 1917, and July 1, 1919. They prohibit the importation of five-needled pines, currants, or gooseberries into Oregon or the other western states from any foreign country, or the eastern United States. The quarantine lines laid down are as follows: on the east, the western boundaries of Minnesota, Iowa, Missouri, Arkansas, and Louisiana; on the north, the Canadian boundary; on the west, the Pacific Ocean; and on the south, the Mexican boundary. Thus the West is walled off on every side from the introduction of White Pine Blister Rust, if these quarantines are rendered effective.

Oregon does not have a law requiring the terminal inspection of plant stock carried by parcel post. Recent investigations in other western states have shown that a tremendous amount of plant stock is moved by this medium of transportation, and that it contains much material of interest to those who are endeavoring to enforce the White Pine Blister Rust quarantines. Here is a definite loophole by which plants infected with White Pine Blister Rust may be entering Oregon today. Regulations have been laid down by the Post Office Department whereby any state, after a declaration of intention, may inspect parcel post packages containing plant stock. These regulations furthermore impose a fine of $100 upon any person who ships plant stock by parcel post into such a state without definitely labeling the package as containing such. The opportunity is clear for those states which wish to take advantage of it. The Office of Blister Rust Control earnestly advises all western states to set up a system of parcel post inspection to prevent the introduction of White Pine Blister Rust, as well as other diseases and insect pests.

Summary of Situation

The people of Oregon have doubtless read previously of the introduction of White Pine Blister Rust into northeastern America. Later reports have told of its destructiveness in the native pine stands there. Very likely the principal feeling of these readers has been one of relief in that they have imagined that this was one plant disease problem with which the West did not have to cope. Probably the pine owners in New England and other eastern states had similar thoughts a few years ago, when they read of the destruction to the pine stands in Europe, due to this disease. The Atlantic Ocean formed a seemingly insurmountable barrier to its spread. Likewise, the immense stretch of pineless country embody-

ing the Great Plains constitutes a similar barrier to protect the West from the infected areas in the East. Will it prove to be more efficacous than did the Atlantic Ocean? If natural means of dissemination alone were to be considered, the disease would never have crossed the Atlantic. The transportation of plants by man brought the disease to Eastern America. That is the only means by which it can reach the West.

Let us cast up the western situation in ledger form, and see where we stand. On the debit side we have the cost of maintaining an efficient quarantine, at most a few thousand dollars a year. On the credit side we have the value of the white pine timber which will be cut in the West, during all future time. As our ledger shows us, there should be no doubt in this matter. No effort on our part will be too great, if we succeed in keeping White Pine Blister Rust out of the West. If it enters Oregon and the other western states, it will be the fault of some few individuals. It is the duty of people in the East not to ship currants, gooseberries or five-needled pines into the West. It is equally the duty of Westerners not to order these plants from eastern nurseries, or to request their friends there to send them.

In the West, we may think of White Pine Blister Rust as something nebulous and far away. Let us for a moment assume that this disease is widespread in this region on sugar pine and western white pine. Then considering data showing its destructiveness in Europe and Eastern North America, it takes on a new significance and becomes a problem in which everyone of us is concerned.

OREGON GROWERS' ASSOCIATION GRADING RULES AND REGULATIONS FOR APPLES AND PEARS

DEFINITION OF TERMS

Tolerance

In order to provide for the variations incident to commercial grading and handling, a "tolerance" of five per cent for a total of all defects from the standard will be permitted in all grades and shall be computed by counting, weighing or measuring the specimens judged to be below the standard of the grade.

Worm Stings

The term "worm stings," as used in the following grading rules, shall be interpreted to mean "thoroughly healed over stings," as the healing over of the sting is the only evidence we have to show that the so-called sting is not infected.

Scab

Fancy Grade. Scab spots not larger than one-quarter (¼) inch in diameter in the aggregate shall be permitted in the Fancy Grade.

"C" Grade. Scab spots not larger than one-half (½) inch in diameter in the aggregate shall be permitted in the "C" Grade.

Uniform in Size

The term "uniform in size" shall be construed to mean that apples in any one package shall not vary more than one-half (½) inch in their greatest transverse diameter.

Packing

The term "properly packed" shall refer to the arrangement of apples in each package; apples to be properly packed shall be arranged in the container according to the approved and recognized methods, and all packages shall be tightly filled, but the contents shall not show excessive or "unnecessary bruising" as a result of the pressure exterted in enclosing an overfilled package.

APPLE GRADING RULES

Season 1920

Extra Fancy. Extra Fancy apples are defined as sound, mature, clean, hand-picked, well-formed apples only, free from all insect pests, diseases, blemishes, bruises and holes, spray burns, limb rub, visible watercore, skin punctures or skin broken at stem, but slight russeting within the basin of the stem shall be permitted.

Fancy Grade. Fancy apples are defined as apples complying with the standard of Extra Fancy Grade, except that slight leaf rubs, scratches or russeting shall be permitted up to a total of 10 per cent of the surface, and provided that scab spots not larger than one-quarter inch in diameter in the aggregate shall be permitted in this grade.

"C" Grade. "C" Grade apples shall consist of sound, mature, handpicked apples which are practically free from infection, bruised or broken skin, and which are not badly misshapen, provided that two healed worm stings, slight sun scald, and scab up to a total of one-half inch in diameter, shall be permitted in this grade.

Combination Grade. When Extra Fancy and Fancy apples are packed together, the boxes must be marked "Combination Extra Fancy and Fancy." When Fancy and "C" Grade apples are packed together, the box must be marked "Combination Fancy and 'C' Grades." Combination grades must contain at least 25 per cent of apples which are of such a grade as would be permitted in the higher grades. None of the higher grade apples shall be sorted out of any lot and the remainder packed as combination grade.

Orchard Run. When Extra Fancy, Fancy and "C" Grade apples are packed together, the boxes must be marked "Orchard Run," but Orchard Run apples must not contain any fruit that will not meet the requirements of "C" Grade. None of the higher grade apples shall be sorted out of any lot and the remainder packed as "Orchard Run."

Unclassified. All firm apples which are practically free from infection, but which do not conform to the foregoing specification of grade, or if conforming, are not branded in accordance therewith, shall be classed as "Unclassified," and so branded, provided that no restriction shall be placed on the number of worm stings admitted to this class. Open worm holes will not be permitted. This grade must be plainly marked with the word "Unclassified."

Color Requirements. Apples shall be admitted to the first and second grades, subject to the following color specifications. The percentage stated refers to the area of the surface which must be covered with a good shade of red.

Solid Red Varieties

	Extra Fancy	Fancy
	%	%
Aiken Red	75	25
Arkansas Black	75	25
Baldwin	75	25
Black Ben Davis	75	25
Detroit Red	75	25
Gano	75	25
King David	75	25
Red June	75	25
Spitzenburg Esopus	75	25
Spitzenburg Kaign	75	25
Vanderpool	75	25
Winesap	75	25
Jonathan	66 2-3	25
McIntosh Red	66 2-3	25

Striped or Partial Red Varieties

	Extra Fancy %	Fancy %
Delicious	66 2-3	25
Stayman Winesap	66 2-3	25
Black Twig	50	25
Ben Davis	50	15
Bonum	50	15
Fameuse	50	15
Geniton	50	15
Hubbardston	50	15
Limbertwig	50	15
Missouri Pippin	50	15
Northern Spy	50	15
Ontario	50	15
Red Astrachan	50	15
Rainier	50	15
Rome Beauty	*50	15
Salome	50	15
Stark	50	15
Sutton	50	15
Willow Twig	50	15
Wagener	50	15
Wealthy	50	15
York Imperial	50	15
Alexander	25	10
Chenango	25	10
Jeffries	25	10
Gravenstein	25	10
King	25	10
Oldenburg	25	10
Shiawassee	25	10
Twenty Ounce	25	10

*No color requirements on Fancy Rome Beauty, 96 and larger.

Red Cheeked or Blushed Varieties

Extra Fancy—Perceptibly Blushed Cheek
Fancy—Characteristic Color
Hydes King, Maiden Blush, Red Cheek Pippin, Winter Banana.

Green and Yellow Varieties

Extra Fancy—Characteristic Color
Fancy—Characteristic Color
Grimes Golden, Yellow Newtown, White Winter Pearmain, Cox's Orange Pippin, Ortley, Yellow Bellflower, Rhode Island Greening.

Summer and Early Fall Varieties

Summer varieties, such as Astrachan, Bailey's Sweet, Beitigheimer, Duchess, Early Harvest, Red June, Strawberry, Twenty Ounce Pippin, Yellow Transparent and kindred varieties not otherwise specified in these grading rules, together with early fall varieties, such as Alexander, Blue Permain, Wolf River, Spokane Beauty, Fall Pippin, Waxen, Tolman Sweet, Sweet Bough and other varieties

not provided for in these grading rules, as grown in sections of early maturity, shall be packed in accordance with the grading rules covering Fancy Grade as to defects, but regardless of color.

The style of the pack to be left to the discretion of the packing department of the Oregon Growers' Packing Corporation.

PEAR GRADING RULES

Season 1920

Oregon Standard Pear Box

The standard pear box for the State of Oregon shall be of the following inside dimensions: Eight and one-half inches deep, 11½ inches wide and 18 inches long, and have the outside length of 18¾ inches. The half box shall be recognized as one of the official packs.

All grades of pears as defined by these regulations shall be properly packed in the standard pear box.

Grades

There shall be two regular or standard grades of pears, Extra Fancy and Fancy.

Every box of pears shall have clearly marked upon it the grade, the name of the variety contained therein or the words "Variety Unknown," the name of the place where grown, the name of the grower, or, in case of sale or shipment through an association or shipper, the name of the association or shipper, net weight and number contained in the box. Packed boxes must weigh not less than 42 pounds net and should weigh 51 pounds gross, except Winter Nelis which should weigh at least 40 pounds net. All packed pears shall be wrapped.

Extra Fancy Grade. This grade shall consist of pears that are mature, hand-picked, clean, sound and free from insect pests, sun scald, scab, scale or other diseases, worm holes, stings, broken skin, bruised, or evidence of frost, by russeting, rough handling or other serious defects, excepting russeting covering a total area not to exceed one inch diameter may be admitted, except it be upon varieties which are naturally russetted more or less. Slightly misshapen or slightly rubbed fruit may be admitted to this grade.

In the case of Winter Nelis and Bosc varieties, same grading will apply, except that the natural russeting is desirable and required.

Fancy Grade. This grade shall consist of all fruit which does not meet the requirement of the Extra Fancy Grade as to blemishes and deformities, but which in every way is sound and merchantable and free from disease. Scab to a total area of one-half inch in diameter, and not to exceed two worm stings healed thoroughly, shall be permitted in this grade.

Packing

The term "properly packed" shall refer to the arrangement and the amount of pears in each box. Pears to be properly packed shall be arranged in the box according to approved and recognized methods, with no flag ends showing and all boxes shall be tightly filled, but the contents not to show excessive or unnecessary bruising as a result of the pressure exerted in lidding the box. Each packed box must show a minimum bulge of three-fourths inch on both top and bottom.

Apple Packs

Style of Pack	Count	No. in Rows	Layers	Tier
2–1	36	4–4	3	3(2½)
2–1	45	5–5	3	3(2½)
2–2	48	3–3	4	3
2–2	56	4–3	4	3
2–2	64	4–4	4	3½
2–2	72	5–4	4	3½
2–2	80	5–5	4	3½
2–2	88	6–5	4	3½
2–2	96	6–6	4	4
3–2	88	5–6	4	3½
3–2	100	4–4	5	4
3–2	113	5–4	5	4
3–2	125	5–5	5	4
3–2	138	6–5	5	4½
3–2	150	6–6	5	4½
3–2	163	7–6	5	4½
3–3	180	5–5	6	5
3–3	198	6–5	6	5
3–3	216	6–6	6	5
3–3	234	7–6	6	5

Rules for Estimating Paper

	Apples	Pears
Wraps for packing 100 boxes	50 lbs.	50 lbs.
Lining for packing 100 boxes	7½ lbs.	7½ lbs.

We would recommend the use of cardboard top and bottom on Comice, Anjou and Bosc, and on all four-tier pears, that is, the 2-3 pack. Size limitation as follows:

	1st Grade Minimum	2d Grade Minimum
Bartletts	180	210
Winter Nelis	210	245
D'Anjou	180	210
Comice	180	195
All others	180	195

Rules for Use of Paper

Apples. Use 9x9 for 175, 163, 150, 138, 125, 113 packs.
Use 10x10 for 113, 104, 100, 96, 88 packs.
Use 11x11 for 80, 72, 64, 56, packs.
Use 12x12 for 50, 48, 41, 36, 32 packs.
Pears. Use 9x9 for 195, 180, 165 packs.
Use 10x10 for 150, 135, 120, 110, 100 packs.
Use 11x11 for 90, 80, 70, 60 packs.

STANDARD LOADING METHOD OUTLINED BY RAILROADS

Carloads

Load all boxes on side lengthwise of car.

(a) Place first row of boxes across car on car floor against end of car; leave equal space between rows lengthwise of car according to number of boxes and width of car.

(b) Place second row of boxes across car directly in front of boxes in first row, all boxes driven in tight contact with first row of boxes.

(c) Continue in this manner from each end of car, leaving space in doorway for bracing.

(d) Apply two car strips (½x1¼ in.) crosswise of car to every layer of boxes in each stack to height of load, including top layer, each strip to extend completely across all boxes in layer to which applied. Ends of strips on first layer to butt against one side of car. Ends of next set of strips to butt against opposite side of car and alternate in this manner to top of load. Strips to be nailed to each box with 4d nails. Or apply four car strips 4 ft. x ½ in. x 1¼ in. crosswise of car to every layer of boxes in each stack to height of load, including top layer. Ends of strips to butt against each side of car. Strips to be nailed to each box with 4d nails.

(e) Bulkhead load in each end of car and brace as follows:

Place a piece of 1x4 in. sound wood crosswise of car against bottom layer at car floor, and at center of boxes in other layers, to height of load.

Place a 2x4 in. sound wood upright against and at center of each row of boxes next to car doors. If boxes loaded seven rows across car, place 2x4 in. sound upright against and at center of third and fifth row of boxes, the second upright from each side extending to roof of car, balance to height of load. If boxes loaded eight rows across car, place 2x4 in. sound wood upright against and at center of each row of boxes next to car doors. Place 2x4 in. sound upright against and at intersection of second and third, fourth and fifth, and sixth and seventh rows of boxes, the second upright from each side extending to roof of car, balance to height of load. Each upright to be nailed to 1x3 in. crosspieces.

Place two car strips across car, one opposite second layer from top of load, the other at center layer nailed to each upright.

Place three pieces 2x4 in. braces lengthwise of car between each upright; one at top, one at center, and one at car floor. Cross braces on floor to be cut longer than space between uprights and driven down to car floor and toe-nailed to the uprights.

Center cross-braces to be cut longer than space between uprights and driven in between uprights on top of the car strips and toe-nailed to the uprights.

Insert top cross-braces last and in the same manner as center cross-braces.

All wood for bracing to be sound. Dimensions named for strips and bracing are the minimum.

STANDARD PACKING AND GRADING RULES OF THE APPLE GROWERS' ASSOCIATION, HOOD RIVER, OREGON

Blue Diamond Grade (Growers Stamp "Extra Fancy" on Center of Box End)

This grade is defined as smooth, mature, clean, handpicked, well-formed apples only. Free from all insect pests, diseases, blemishes, bruises and other physical injuries, scald, fungus, scale, dry or bitter rot, worms, worm stings, worm holes, spray burn, limb rub, visible water core, skin puncture or skin broken at the stem.

The following varieties shall be admitted to this grade, subject to the color requirements specified:

Arkansas Blacks, Spitzenburgs, Winesaps. Must have not less than three-fourths good red color.

Jonathans and Delicious. Must have not less than two-thirds good red color.

Oregon Reds. Must have three-fourths good red color and the characteristic russeting of this variety must not extend to the cheek.

Hyde's King, Red Cheek Pippin, Winter Banana. Must have a perceptible blush cheek.

Ortley. Must be white, yellow or waxen.

Yellow Newtowns. Must have the characteristic color of the variety.

All fruit packed under this grade must be wrapped in the printed Blue Diamond paper. All boxes to be lined and layer boards to be used, tops and bottoms.

By color is meant the characteristic color of the variety. A brown, faded or dead color will not be accepted.

Red Diamond Grade (Growers Stamp "Fancy" on Center Box End)

This grade is defined as apples complying with the standard of the first grade apples, except that slight leaf rubs, scratches or russeting shall be permitted up to a total of one inch in diameter in counts running 125 or less to the box, or three-fourths of an inch in diameter in counts running 138 to 163 to the box, and one-half inch in diameter in counts running 175 or more to the box, in all cases where the color requirements are equal to the color rules provided for this grade. Limb rubs will be permitted showing an aggregate area in the various counts of one-half the diameter of that allowed for leaf rubs.

No apple packed under this grade shall show total blemishes aggregating more than one inch in diameter in counts running 125 to the box or less, or more than three-fourths of an inch in diameter in counts running 138 to 163 to the box, and one-half of an inch in diameter in counts running 175 or more to the box.

Provided, that all red and striped varieties having the color requirements of Extra Fancy shall be allowed to carry not to exceed one healed-over sting, and all yellow or blush varieties having all requirements for Extra Fancy, be allowed to carry not to exceed one healed-over sting.

Provided always, that all apples must have one clean cheek equal to one-half of the area of the apple.

No clearly misshapen or bruised apples shall be permitted in this grade.

The following varieties shall be admitted to this grade subject to the color requirements as specified:

Arkansas Blacks, Spitzenburgs and Winesaps must have not less than 40 per cent good red color.

Jonathans and Delicious must have not less than one-third good red color.

Red cheek or blushed varieties must have correct physical qualities with tinge of color.

Yellow or green varieties must be of characteristic color.

All fruit packed under this grade must be wrapped in the printed Red Diamond paper. All boxes must be lined and layer board be used, top and bottom.

Combination Blue and Red Diamond Grades (Growers to Stamp "Fancy" on the Center of Box End)

This grade is provided as a commercial outlet for all varieties of apples not included in the varieties as specified under grading rules for Blue and Red Diamond grades. Physical defects are limited to the defects specified under Red Diamond Brand.

Aiken Red, Baldwin (except Oregon Reds), Gano, King David must have at least 40 per cent good red color.

Ben Davis, Hubbardston, Jeniton, Missouri Pippin, Black Twig, Northern Spy, Snow, Stayman, Winesap, Wagener, Wealthy, York, Imperial must have not less than one-fourth good red color.

Green or yellow varieties, such as White Winter Pearmain, Cox Orange, Grimes and Swaars must be of characteristic color.

Red cheek or blush varieties, such as Maiden Blush, must have correct physical quality with tinge of color.

Rome Beauties must have a perceptible blush or overcast of reddish color characteristic of this variety.

All apples packed under this grade must be wrapped in printed Red Diamond paper. All boxes must be lined and layer board be used, top and bottom.

Defiance or Mountain Grade (Growers to Stamp "C" Grade on Center of Box End)

This grade shall consist of mature, handpicked apples, free from all insect pests, worms, worm holes, infectious diseases, skin puncture, bruises or broken skin, but slightly misshapen apples or those having slight sun scald, and not to exceed two healed-over stings, and the blemishes allowed for Red Diamond grade shall be permitted.

All apples of striped or red varieties must have a tinge of color. All apples 175 and smaller in red varieties must carry 25 per cent color, and in striped varieties must carry 10 per cent color; all apples must have one clean cheek. All fruit packed under this grade must be wrapped in plain paper, and all boxes must be lined and layer board to be used, top and bottom.

Sizes

We are appending a list of sizes permitted under Northwest grading rules: Apples smaller than allowed in standard grades, but otherwise conforming to the requirements thereof, may be packed and stamped under these grades, if desired by the grower. Such apples will be sold as market conditions warrant. It would be wise to consult your sales office before packing smaller sizes than suggested in these rules.

Wiping Apples

Better results can be secured if we can offer the trade bright attractive apples, removing all signs of spray, dust or aphis. All apples must be clean when packed, and apples must be wiped when necessary. This rule is imperative where growers have used Bordeaux as a late spray, or where aphis is serious.

Marking Boxes

Regularity is most desired, and we urge care in proper marking. On one end of the box at the upper left hand edge mark the size (number of apples) and on the upper right hand edge mark the grower's number. On the upper center mark the variety. On the center of this end, so the words can be covered with our label, mark the grade. On the other end of the box at the upper left hand edge, mark the grower's name and address, and on the upper right hand edge, mark the packer's number, (see cuts). In the use of stamps for marking boxes, you must provide yourself with the regulation black ink pads, so as to create a uniformity of packages.

Be careful, please, in marking boxes as to correct size. Some of our members are using the hundred pack and mismarking the boxes. See that all sizes are shown correctly; if you pack 100 count, mark boxes 100, (see cuts).

Explanation

It is the purpose of these grading rules to cover the physical defects, so far as it lies in our power in making our apples commercial in all respects.

There can be but one definition for Blue Diamond, and we must maintain that standard.

In our Red Diamond grade, it is the purpose of these rules to have apples that meet the color requirements of this grade, to carry only the physical defects permitted in this grade, believing that the lack of color is in itself a defect.

We are attaching herewith a table of sizes admitted to these grades, with the understanding that the commercial apple now provided for American use covers the sizes as noted, but it is absolutely necessary in packing the smaller apples to have them as attractive as possible in their sizes.

Paper

As a commercial proposition, as well as a matter of economy, your association has provided the different sizes of paper for the different sizes of fruit. You will, therefore, arrange to order and use the following sized paper for the sizes of fruit as noted:

80 and larger to the box, 12x12.

88 to 125 to the box, 10x10.

138 to 163 to the box, 9x9.

175 and smaller to the box, 8x8.

As we are advertising very extensively, it is very important that you pack all the Blue Diamond grade under the Blue Diamond wraps; the Red Diamond grade under the Red Diamond wraps, and the Combination grade, being the Blue and Red combined, is shipped out under our Red Diamond label and must be wrapped in Red Diamond paper. The misuse of this printed paper would work to the detriment of your association.

Variety	Min. Size Extra Fancy	Min. Size Fancy and Combination	Min. Size C Grade
Aiken Red	.....	200	200
Arkansas Black	225	200	200
Baldwin	.....	200	200
Ben Davis	.....	200	200
Cox's Orange Pippin	.....	200	200
Delicious	163	163	200
Gano	.....	200	200
Grimes Golden	.....	200	200
Gravenstein	.....	175	200
Hubbardston Nonesuch	.....	163	200
Hyde's King	200	200	200
Jeniton	.....	225	200
Jonathan	225	225	200
Jeffries	.....	225	200
Kaign Spitzenburg	.....	200	200
King Tomkins Co.	.....	163	200
King David	.....	225	200
Maiden Blush	.....	163	200
McIntosh Red	.....	225	200
Missouri Pippin	.....	200	200
Mammoth Black Twig	.....	200	200
Northern Spy	.....	200	200
Oregon Red	225	.....	.....
Ortley (Cleopatra)	225	225	200
Rainier	.....	200	200
Rome Beauty	.....	.....	200
Red Cheek Pippin	200	200	200
Spitzenburg	225	225	200
Stayman	.....	200	200
Snow	.....	225	200
Vanderpool	.....	200	200
Winesap	225	225	200
Wagner	.....	200	200
Winter Banana	163	163	200
White Pearmain	.....	225	200
Wealthy	.....	200	200
Yellow Newtown	225	225	200
York Imperial	.....	200	200

Standard Marking for Boxes

150	Spitzenburg	Grower 231
	EXTRA FANCY	

John Doe, Hood River, Oregon	Packer Number 120

Yours very truly,
APPLE GROWERS ASSOCIATION,
A. W. Stone, General Manager,
C. W. McCullagh, Sales Manager.

September 20, 1917.

Standard Pear Packs

Tier	Style	Row	No. in Box
5	4–3	6–6	210
5	4–3	6–5	193
5	3–3	6–6	180
5	3–3	6–5	165
5	3–3	5–5	150
5	3–3	5–4	135
5	3–3	4–4	120
4	3–2	6–5	110
4	3–2	5–5	100
4	3–2	5–4	90
4	3–2	4–4	80
4	3–2	4–3	70
4	3–2	3–3	60

The diagonal pack is used for all pears.

Pears are generally packed directly from the picking box, and the rules for packing are about the same as in the case of apples. They are generally packed with a much greater bulge, however, than is customary with apples, since the shrinkage of the pear is greater than that of the apple.

STATEMENT

Of the Summaries of Horticultural Statistics of the State of Oregon for the Year 1920, in Acres

(Compiled by the State Tax Commission)

COUNTY	Apple Trees Bearing	Apple Trees Nonbearing	Cherry Trees Bearing	Cherry Trees Nonbearing	Peach Trees Bearing	Peach Trees Nonbearing	Pear Trees Bearing	Pear Trees Nonbearing	Prune Trees Bearing	Prune Trees Nonbearing
Baker	389.00	4.00	10.00		50.00		12.00		11.00	
Benton	1,336.25	74.00	15.00		60.75	2.00	164.75	3.50	755.75	115.50
Clackamas	1,639.00	53.25	97.75	7.50	59.25	7.25	64.00	3.00	853.00	326.50
Clatsop	408.00									
Columbia	483.75	32.75	13.50	4.00			7.25	5.50	16.00	1.00
Coos	780.00	30.00			5.00	1.00	14.00	1.00	29.00	7.00
Crook	12.00						2.00		3.00	
Curry	217.50	27.50			.50			.50		
Deschutes	34.00	.50								
Douglas	3,286.50	277.75	138.75	20.75	219.25	3.50	785.75	142.50	3,045.75	2,918.25
Gilliam										
Grant	112.00								2.25	
Harney										
Hood River	8,827.75	1,619.25	28.00	22.00	13.00	1.50	305.50	436.00	6.25	3.50
Jackson	5,091.00	604.25	39.25	21.50	337.00	187.50	5,264.00	2,787.00	110.00	2.00
Jefferson	54.50	20.50	4.00	3.00	15.75		5.00		4.50	
Josephine	378.00	26.00	5.00		137.00		570.00	293.00	10.00	
Klamath										
Lake										
Lane	2,116.25	221.75	462.50	130.00	145.75	23.75	495.25	44.25	1,158.25	658.25
Lincoln	263.00	9.00	.25		.25		48.00		18.00	.25
Linn	210.50	180.00	41.00		32.00	4.00	19.00	29.00	784.00	226.00
Malheur	1,772.32	30.00	105.00	.50	271.00	13.00	30.50	2.00	395.50	56.00
Marion	2,417.00	131.50	416.50	81.00	212.50	60.00	267.00	126.50	6,907.50	1,794.00
Morrow										
Multnomah	258.75	47.00	194.75	4.00	1.00	22.00	69.75	8.50	78.75	
Polk	1,587.25	240.25	529.75	172.00	86.00	40.00	136.50	79.75	3,833.75	3,042.75
Sherman	27.00		4.25			29.00	7.00		5.00	
Tillamook	728.00	121.00					87.00		212.00	
Umatilla	2,021.00	180.00	130.00	54.00	52.00	4.00	251.00	213.00	743.00	594.00
Union	1,668.00	543.00	286.00	45.00	10.50	1.75	80.00	1.50	237.25	16.50
Wallowa	102.00		8.00							
Wasco	2,579.75	2,523.50	363.00	70.50	346.50	65.50	6.25	13.00	149.50	57.25
Washington	1,491.61	27.87	115.50	21.25	27.25	7.50	116.50	40.75	1,881.50	597.00
Wheeler	77.00		8.00		9.00		9.50		8.50	
Yamhill	1,537.75	351.50	621.66	6.50	82.75	8.75	64.50	99.75	3,963.75	3,241.75
Total	41,906.43	7,376.12	3,637.41	663.50	2,174.00	482.00	8,882.00	4,330.00	25,222.75	13,657.50

STATEMENT OF SUMMARIES—Continued

COUNTY	Walnut Trees Bearing	Walnut Trees Nonbearing	Loganberries	Blackberries and Raspberries	Strawberries	Other Fruits and Nuts Bearing	Other Fruits and Nuts Nonbearing
Baker	1.00			1.00	2.00		
Benton	38.00	36.50	92.50	26.75	44.50	30.00	14.00
Clackamas	77.00	74.50	133.00	89.00	392.00	278.00	39.25
Clatsop			15.00	4.00	5.00	120.00	
Columbia	2.25	.25	5.00	3.75	28.00	81.25	5.00
Coos	2.00	10.00	37.00	11.00	25.00	17.00	4.00
Crook							
Curry							
Deschutes					.75		
Douglas	85.00	26.75	118.50	8.50	36.50	157.75	13.50
Gilliam							
Grant				.25		.25	
Harney							
Hood River	1.00	6.00	4.00	.50	533.50		
Jackson	6.50	27.00	7.50	3.75	20.25	91.50	19.75
Jefferson							
Josephine					5.00		95.00
Klamath							
Lake							
Lane	181.25	74.75	152.75	67.00	108.75	106.50	37.50
Lincoln		.25	16.00	4.00	5.00	1.25	
Linn	15.25	35.25	130.75	121.75	128.50	6.00	6.00
Malheur	5.00	52.00					
Marion	294.00	317.00	3,446.00	2,940.00	875.00	250.00	204.00
Morrow							
Multnomah	16.50	1.00	103.25	537.25	433.75	311.50	56.75
Polk	131.75	252.25	350.75	51.00	232.50	65.00	59.25
Sherman	.25			2.75		19.25	
Tillamook			38.00		21.00		
Umatilla		1.00	4.00	13.00	20.00	13.50	3.00
Union	.25		6.50	24.25	14.75		
Wallowa						10.00	
Wasco	16.50		1.25	5.75	27.25	167.75	20.00
Washington	277.50	230.50	211.75	57.75	86.75	56.58	3.50
Wheeler					1.00		
Yamhill	1,524.29	469.25	493.62	328.70	161.50	25.75	119.00
Total	2,675.29	1,614.25	5,367.12	4,301.70	3,208.25	1,808.83	699.50

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF CROP ESTIMATES

F. L. Kent, Field Agent

Portland, Oregon, November, 9, 1920

Production of apple crop in Oregon, as indicated by conditions on November 1, 1920, also the five-year average production, is estimated by the United States Bureau of Crop Estimates as follows:

	1920	1919	Five-Yr. Av.
Apples, total, bushels	3,471,000	5,579,000	4,080,000
Apples, commercial bushels	2,800,000	4,071,000	2,500,000

SPECIMENS

Walnut Crop Is Large

Castlerock, Wash., Oct. 13.—The English walnut crop is heavy in this section. Fred Hatch gathered 200 pounds from one 28-year old tree in his front yard and contracted to sell them at 40 cents per pound.

Polk Cherry Farm Yields $899 Acre

A remarkable yield of cherries from the orchard of Wess M. Elliott of Polk County is reported. Elliott, a member of the Oregon Cooperative Growers Association, received $4,408 for the crop off five acres, or $899.60 an acre. Next year he expects to have 10 acres bearing. He has set his acreage to Lamberts, Black Republicans, Bings and Royal Annes, the latter being his best producers.

Bean Grower Retains Title

Cottage Grove Or., Oct. 2.—(Special)—A. J. Stevens maintains his reputation as the champion bean grower of this section. From an acre and a half of ground he has picked close to nine tons of beans. He will receive about 4 cents the pound, making his return about $480 to the acre. He raised Kentucky Wonders, a large, heavy yielding variety.

Cranberries on Mr. W. E. Schineff's bog yielded 100 barrels per acre.

J. E. Stansberry, of Portland, gathered and sold from four Lambert cherry trees $387 worth of cherries to the canneries.

One Apple Orchard With 3,800 Acres, 200,000 Trees

At Dufur, 17 miles south of The Dalles, is located the largest apple orchard in the world, the plant and acreage of the Dufur Orchard Co-Owners company. There are at the present time 3,800 acres under cultivation, with 200,000 trees already planted. The longest rows of trees in the orchard extend for approximately ten miles in a straight line. Two hundred carloads of choice apples, comprising 6,400,000 pounds, were shipped to practically every state of the Union last year.

Government Whitewash

The following is the government formula for whitewash and will be found very useful on every farm, for the liberal use of whitewash not only adds greatly to the appearances about the farm, but it also serves an excellent purpose in destroying germ life. This formula, which we are reproducing, should be saved for reference and used often:

One-half bushel unslaked lime, 1 peck of salt well dissolved in warm water, 3 pounds of ground rice boiled to a thin paste, stirred into the mixture when boiling hot; half pound of powdered Spanish whiting, 1 pound glue previously dissolved over a slow fire. Five gallons of hot water complete the mixture.

Stir well and let it stand for a few days before using. Protect it from dirt and extraneous matter. It should be put on while hot. One pint of the mixture will cover a square yard if properly applied. This can be used with brushes or with a machine. The salt and lime both possess disinfecting qualities and the glue gives a lasting finish and prevents the whitewash from rubbing off. Anyone who has used the ordinary solution without glue will be surprised at the great improvement this makes.

Making Your Own Grafting Wax

Melt together and thoroughly mix, 4 pounds resin, 2 pounds beeswax, 1 pound tallow. Pour into cold water and when cool, pull as taffy until light colored and smooth (grease the hands with tallow) then shape into any form. Will keep in a cool place indefinitely. Some use paraffin instead of tallow.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF CROP ESTIMATES

F. L. Kent, Field Agent
402 Custom House, Portland, Oregon
February 2, 1920

LIVESTOCK REPORT

Estimated numbers of various classes of livestock and value per head on January 1, for the five year period, 1916 to 1920, in Oregon and the United States.

	YEAR	OREGON		UNITED STATES	
		Number	Value	Number	Value
Horses	1920	282,000	$ 85.00	21,109,000	$ 94.39
	1919	303,000	89.00	21,482,000	98.45
	1918	300,000	98.00	21,555,000	104.24
	1917	300,000	98.00	21,210,000	102.89
	1916	295,000	89.00	21,159,000	101.60
Mules	1920	10,000	91.00	4,995,000	147.10
	1919	10,000	93.00	4,954,000	135.83
	1918	10,000	102.00	4,873,000	128.81
	1917	10,000	103.00	4,723,000	118.15
	1916	10,000	93.00	4,593,000	113.83
Dairy Cattle	1920	224,000	83.00	23,747,000	85.13
	1919	222,000	66.00	23,475,000	78.20
	1918	227,000	60.00	23,310,000	70.54
	1917	225,000	55.00	22,894,000	59.63
	1916	216,000	55.00	22,108,000	53.92
Other Cattle	1920	708,000	46.20	45,085,000	43.14
	1919	703,000	44.80	44,385,000	44.22
	1918	683,000	39.50	44,112,000	40.88
	1917	610,000	37.30	41,689,000	35.92
	1916	553,000	32.20	39,812,000	33.53
Sheep	1920	2,547,000	11.00	48,615,000	10.52
	1919	2,497,000	12.00	48,866,000	11.63
	1918	2,448,000	12.10	48,603,000	11.82
	1917	2,400,000	8.10	47,616,000	7.13
	1916	2,435,000	5.20	48,625,000	5.17
Swine	1920	314,000	19.50	72,909,000	19.01
	1919	330,000	19.10	74,584,000	22.02
	1918	325,000	17.50	70,978,000	19.54
	1917	315,000	10.00	67,503,000	11.75
	1916	370,000	7.10	67,766,000	8.40

Value per head represents average value for all ages in each class, not value of mature animals only.

The number of animals in villages and towns is not included in the foregoing estimates. According to the 1910 census the number of animals "not on farms" was for Oregon, 30,203 horses; 1,377 mules; 17006 cattle; 1,755 sheep; and 3,060 swine. For the United States the numbers were, 3,183,000 horses; 270,000 mules; 1,879,000 cattle; 391,000 sheep; and 1,288,000 swine.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF CROP ESTIMATES

Number of Domestic Animals, January 1, 1920

(Estimates based on County Assessors' Returns)

COUNTY	Horses and Mules	Milk Cows	Other Cattle	Sheep and Goats	Swine
Baker	16,509	7,529	61,535	151,375	9,436
Benton	3,412	4,725	5,328	42,912	5,016
Clackamas	7,723	11,131	7,631	25,444	13,472
Clatsop	641	3,562	3,035	1,573	1,696
Columbia	2,000	5,613	4,064	2,327	3,595
Coos	3,146	10,587	14,034	11,108	11,287
Crook	8,373	2,570	35,138	54,333	830
Curry	1,127	3,122	6,063	21,300	4,175
Deschutes	4,114	1,648	9,344	28,274	4,220
Douglas	7,185	7,275	16,192	106,858	15,277
Gilliam	9,600	1,256	5,025	122,262	4,642
Grant	12,176	3,333	51,831	138,728	6,411
Harney	13,331	2,004	98,186	103,948	1,193
Hood River	1,142	1,160	323	170	1,643
Jackson	7,117	6,115	24,346	44,913	15,360
Jefferson	4,724	1,209	10,881	21,761	2,503
Josephine	1,756	2,465	5,487	3,964	3,897
Klamath	10,080	4,167	34,719	147,464	6,312
Lake	10,877	1,651	53,396	158,364	2,329
Lane	8,380	11,201	15,469	44,615	17,009
Lincoln	1,729	4,585	5,836	10,874	3,893
Linn	12,007	13,834	19,115	71,016	22,011
Malheur	15,948	3,228	50,625	303,748	11,321
Marion	8,404	12,316	8,639	49,329	22,317
Morrow	10,488	2,553	14,314	155,267	5,042
Multnomah	4,584	9,033	4,059	1,769	8,144
Polk	6,249	7,478	5,642	31,097	10,628
Sherman	9,937	1,635	3,841	27,340	2,844
Tillamook	1,362	13,280	3,562	464	2,695
Umatilla	24,420	6,204	26,541	192,940	14,380
Union	13,994	5,984	20,032	47,639	21,346
Wallowa	13,164	4,732	43,353	114,678	24,308
Wasco	11,790	3,275	17,083	92,734	11,380
Washington	8,080	14,462	10,109	8,809	8,723
Wheeler	8,073	2,084	23,971	135,344	1,807
Yamhill	8,497	8,784	7,483	34,385	13,320
Total number	292,139	205,791	726,232	2,546,737	314,462
Value	$24,901,815	$17,080,653	$33,551,918	$28,014,107	$ 6,132,009

Stock Yard Data

The numbers of livestock of Oregon origin passing through the Portland Union Stock Yards during 1919, as compared with the three years previous, were as follows:

	1919	1918	1917	1916
Cattle	79,697	80,198	68,884	49,941
Calves	8,270	4,883	3,921	3,523
Hogs	143,007	166,558	154,828	207,320
Sheep	154,855	102,298	85,502	112,778

Average top prices per cwt. for 1919, also for the three years previous, computed from data furnished by the Portland Union Stock Yards Co., were as follows:

	1919	1918	1917	1916
Steers	$ 11.74	$ 12.75	$ 9.76	$ 7.77
Cows	9.20	9.85	8.15	6.40
Hogs	18.30	17.70	15.40	9.00
Lambs	13.63	14.90	12.95	9.06

(Compiled from daily and monthly top sales)

F. L. KENT, Field Agent.

USEFUL TABLES

Number of Plants Per Acre at Various Distances

Distance Inches	Plants	Distance Inches	Plants	Distance Feet	Plants	Distance Feet	Plants
1x 1	6,272,640	10x48	13,068	4x 5	2,178	9x10	484
1x 3	2,090,880	15x15	27,878	4x 6	1,815	9x11	440
1x 4	1,568,160	15x30	13,939	4x 7	1,556	9x12	403
1x 5	1,254,528	15x36	11,616	5x 5	1,742	10x10	435
2x 2	1,568,160	18x36	9,680	5x 6	1,452	10x12	363
2x 3	1,045,440	18x48	7,260	5x 7	1,244	10x15	290
2x 4	784,080			5x 8	1,089	10x18	242
		Feet					
2x 5	627,264			5x 9	968	10x20	217
3x 3	696,960	1x 1	43,560	6x 9	1,210	12x12	302
3x 4	522,720	1x 2	21,780	6x 7	1,037	12x15	242
3x 5	418,176	1x 3	14,520	6x 8	907	12x20	181
4x 4	392,040	1x 4	10,890	6x 9	806	15x15	193
4x 5	313,632	1x 5	8,712	6x10	726	15x18	161
5x 5	250,905	2x 2	10,890	7x 7	888	15x20	145
6x 6	174,240	2x 3	7,260	7x 8	777	18x18	134
7x 7	128,013	2x 4	5,445	7x 9	691	18x20	121
8x 8	98,010	2x 5	4,356	7x10	622	18x24	100
9x 9	77,440	3x 3	4,840	8x 8	680	20x20	108
10x10	62,726	3x 4	3,630	8x 9	605	20x24	90
10x20	31,363	3x 5	2,904	8x10	544	20x30	72
10x24	26,136	3x 6	2,420	8x11	495	30x24	60
10x30	20,908	3x 7	2,074	8x12	453	30x30	48
10x36	16,424	4x 4	2,722	9x 9	537	30x36	40

Usual Distances for Planting Vegetables—(Bailey)

Asparagus, rows 3 to 4 feet apart, 1 to 2 feet apart in rows.
Beans, bush, 2 to 3 feet apart, 1 foot apart in rows.
Beans, pole, 3 to 4 feet each way.
Beets, early, in drills 12 to 18 inches apart.
Beets, late, in drills 2 to 3 feet apart.
Cabbage, early, 16x28 inches to 18x30 inches.
Cabbage, late, 2x3 feet to 2½x3½ feet.
Carrots, in drills 1 to 2 feet apart.
Cauliflower, 2x2 feet to 2x3 feet apart.
Celery, rows 3 to 4 feet apart, 6 to 9 inches in row.
Corn, sweet, rows 3 to 3½ feet apart, 9 inches to 2 feet in rows.
Cucumber, 4 to 5 feet each way.
Eggplant, 3x3 feet.
Lettuce, 1x1½ feet or 2 feet.
Melon, musk, 5 to 6 feet each way.
Melon, water, 7 to 8 feet each way.
Onions, in drills from 14 to 20 inches apart.
Parsnips, in drills 18 inches to 3 feet apart.
Peas, in drills, early kinds usually in double rows from 6 to 9 inches apart, late, in single rows 2 to 3 feet apart.
Pepper, 15 to 18 inches x 2 to 2½ feet.
Potatoes, 10 to 18 inches x 2½ to 3 feet.
Pumpkins, 8 to 10 feet each way.
Radish, in drills 10 to 18 inches apart.
Rhubarb, 2 to 4 feet x 4 feet.
Salsify, in drills 1½ to 2 feet apart.
Spinach, in drills 12 to 18 inches apart.
Squash, 3 to 4 feet x 4 feet.
Sweet Potatoes, 2 feet x 3 to 4 feet.
Tomato, 4 feet x 4 to 5 feet.
Turnip, in drills 1½ to 2½ feet apart.

Distances for Planting Trees

(In planting trees, the greater distance should be given on the richer soils)

Walnuts, 50 to 60 feet each way.
Chestnuts, 50 feet each way.
Filberts, 20 feet each way.
Apples, 20 to 30 feet each way.
Pears (Standard), 20 to 25 feet each way.
Pears (Dwarf), 12 to 15 feet each way.
Quinces, 15 to — feet each way.
Peaches, 18 to 24 feet each way.
Plums, 15 to 20 feet each way.
Cherries, 15 to 20 feet each way.
Blackberries, 6 by 4 feet.
Raspberries, 6 by 3 feet.
Gooseberries, 5 by 3 feet.
Currants, 5 by 3 feet.
Strawberries (hills), 36 by 18 inches.
Strawberries (matted rows), 48 by 12 in.
Grapes, 8x8 to 10x12 feet.

NURSERIES IN OREGON

Albany Nursery Company.....Albany
Baker Floral & Seed Company.....Baker
Benedict Nursery Company.....Portland
Butzer, J. J.....Portland
Brooks Nursery Company.....Lafayette
Bester, Carl.....Portland
Brixey, C. T., & Son.....McMinnville
Broetje, Julius.....Milwaukie
Carlton Nursery Company.....Carlton
Capital City Nursery Company.....Salem
Clarke Brothers, Florists.....Portland
Collins, C. M.....Portland
Cummings, Harry.....Heppner
Central Oregon Nursery Co.....Prineville
Cooper, Geo. S.....Salem
Dilla Nursery Company.....Portland
Donald Nursery Company.....Donald
Danzer Floral Company.....Forest Grove
Drew, E. P.....Yoncalla
Eden Valley Nursery.....Medford
Failing, O. W.....Estacada
Fruitland Nursery.....Salem
Forshaw, S. H.....Pendleton
Groner & McClure.....Hillsboro
Galligan, H. S.....Hood River
Gibson, W. R.....Hood River
Gill Brothers.....Portland
Good, H.....Silverton
Holaday, A.....Scappoose
Hobbs, C. D.....Milton
Hood View Nurseries.....Dufur
Hooker, L. W., & Co.....La Grande
Hicks & Riches.....Woodburn
Ideal Fruit & Nursery Co.....Hood River
Jarrish, P. H.....Oswego
Lafayette Nursery Company.....Lafayette
Lewis, D. M., & Co.....Portland
McDonald, M.....Orenco
Mitchell, B. A.....Orenco
Miller, S. A.....Milton
Miller G. W.....Milton
Mt. Tabor Nurseries.....Portland
Monte Vista Nursery.....Scappoose
Mountain View Floral Co.....Montavilla
Mt. Angel Seed & Floral Co.....Mt. Angel
Malheur Nursery Company.....Ontario
Milton Nursery Company.....Milton
Northwestern Nursery.....Salem
Oregon Nursery Company.....Orenco
Portland Wholesale Nursery Co.....Portland
Pilkington, J. B.....Portland
Parker, Geo. H.....Grants Pass
Paterson, H. B.....Medford
Portland Rose Nursery.....Portland
Pattack Brothers.....Union
Russelville Nursery.....Portland
Rahn, Albert E.....Portland
Rae Floral Company.....Eugene
Robbins, G. H.....Hood River
Salem Nursery Company.....Salem
Stanton, F. H.....Hood River
Southern Oregon Nurseries.....Yoncalla
Spencer, H. L.....Eugene
Scott, F. A.....Hood River
Scott-Wood Company.....Portland
State Nursery.....Salem
True-to-Name Nursery.....Hood River
Tualatin Valley Company.....Sherwood
Union Nursery.....Union
Villa Nursery.....Portland
Valley Nursery Company.....Hood River
Woodburn Nursery.....Woodburn
Willow Flat Nursery.....Hood River
Weed Landscape Nursery.....Beaverton
Weygandt, F. A.....Beaverton
Woodruff, R. S.....Eugene
Willow Glen Nursery.....La Grande
Warner & Gore.....Medford
Wist Nursery.....Portland

OREGON COUNTY AGENTS

January 20, 1920

Bennion, Fred, Pendleton, Umatilla
Breithaupt, L. R., Vale, Malheur
Cate, C. C., Medford, Jackson
Calkins, C. C., Moro, Sherman
Cooter, J. E., Toledo, Lincoln
Farr, C. C., Coquille, Coos
Flippin, T. J. Jr., St. Helens, Columbia
Fluharty, A. L., The Dalles, Wasco
Hall, S. B., Gresham, Multnomah
Hoke, Mac, Enterprise, Wallowa
Hunt, L. A., Heppner, Morrow
Hurd, C. J., Roseburg, Douglas
Jamison, N. C., Hillsboro, Washington
Jones, R. C., Tillamook, Tillamook
Kable, Geo. W., Corvallis, Benton
Lechner, H. J., Astoria, Clatsop
Richards, D. E., Lakeview, Lake
Scott, R. G., Oregon City, Clackamas
Smith, S. V., Albany, Linn
Spillman, P. H., La Grande, Union
Thomas, E. H., Klamath Falls, Klamath
Whitney, Ira P., Eugene, Lane

SOLITUDE

Happy the man whose wish and care,
A few paternal acres bound,
Content to breathe his native air
On his own ground.

Whose herds with milk, whose field with bread,
Whose flocks supply him with attire,
Whose trees in summer yield him shade,
In winter, fire.

Blest who can unconcern'dly find
Hours, days and years slide soft away,
In health in body, peace of mind,
Quiet by day.

Sound sleep by night; study and ease
Together mixed; sweet recreation;
And innocence, which most does please
With meditation.

Thus let me live, unseen, unknown,
Thus unlamented let me die,
Steal from the world, and not a stone
Tell where I lie.

Alexander Pope, July 17, 1709.

INDEX

A

Allen, A. C.—Report 12
Allen, A. C.—Oregon Pears 123
Atwell, H. C.—Report 10
Apple boxes, standard size 35
Apple Scab Control—Prof. H. P. Barss 114
Apple Industry—H. H. Weatherspoon 124
Apple Tree Anthracnose—Prof. H. P. Barss 127
Apple Crops in Oregon—F. L. Kent.... 193
Apple Anthracnose Spray 84, 90
Apple Grading Law 38
Apple Grading Rules and Regulations 181
Amend, B. R.—The Culture of the Fig 148

B

Barss, Prof. H. P.—Apple Scab Control 114
Barss, Prof. H. P.—Apple Tree Anthracnose 127
Blister Mite, pear 84
Bordeaux Oil Emulsion Spray—Dr. C. A. Macrum 90
Bordeaux mixture 89
Brown Rot, prune and plum 85
Brown-tail Moth, quarantine 73
Brown Prof. W. L.—Orchard Fertilizing 137

C

Chestnuts—Knight Pearcy 138
Cherries—L T. Reynolds 98
Cherries, spray ..... —
Cherry Fruit Fly—Prof. A. L. Lovett 107
Codling Moth, apple 84
Codling Moth, pear 84
Commissioners and Officers 1
County Inspectors 6
County Agents 197
Cranberry Industry—W. E. Schimpf.. 163

D

District Boundaries 5
Dosch, Henry E.—The Wilder Medal.. 91
Dosch, Henry E.—Functions of the State Board 172
Dosch, Henry E.—Horticulture in Oregon 101
Domestic Animals 194
Dorris, Ben—Filbert Grove 135
Dust Spray 90

E

European Corn Borer—Quarantine.... 68
European Corn Borer—Quarantine.... 70
European Corn Borer—Prof. E. P. Felt 113

F

Felt, Prof. E. P.—European Corn Borer 113
Figs, the Culture of—B. R. Amend.... 148
Filbert Grove—Ben Dorris 135
Filbert Culture—A. M. Gray 141
Filbert, importation of 141
Function of the State Board—Henry E. Dosch 172
French Fruit Stocks, bad condition 67

G

Gile, H. S.—The Loganberry 149
Gipsy Moth—Quarantine 73
Grafting Wax 194
Gray, A. M.—Filbert Culture 141
Grading Rules and Regulations for Apples and Pears 181

H

Horticultural Law 29
Horticulture in Oregon—Henry E. Dosch 101
Horticultural Statistics 191

I

Importation of Nursery Stock—Quarantine 65
Indian Meal Moth—Prof. A. L. Lovett 118
Iron Sulphide Mixture 89

J

Japanese Beetle 62

K

Kent, F. L.—Livestock Report 194
Kent, F. L.—Apple Crops in Oregon 193
Kerosene Emulsion 88

L

Law, Horticulture 22
Lewis, Prof. C. I.—Some Needs in Oregon Horticulture 93
Livestock Report—F. L. Kent 194
Loganberry, The—H. S. Gile 149
Lovett, Prof. A. L.—Cherry Fruit Fly 107
Lovett, Prof. A. L.—Indian Meal Worm 118
Lovett, Prof. A. L.—Strawberry Root Weevil 155
Lovett, Prof. A. L.—Strawberry Crown Borer 160

M

Mally Fruit Fly 109
Macrum, Dr. C. A.—Bordeaux Oil Emulsion Spray 90
Mildew—Iron Sulphide Spray 89
Misbranded Insecticides and Fungicides 33

N

Nurseries 197
Nursery Stock—Quarantine 49
Nursery Stock—Regulations 50
Nursery Law 36

O

Officers and Commissioners 1
Oregon Pears—A. C. Allen 123
Oregon County Agent 197
Oriental Quarantine 65
Orchard Fertilizing—Prof. W. S. Brown 167

P

Park, Chas. A.—President's Report.. 7
Pearcy, Earl—An All-Star Prune Orchard 143
Pear Thrips—Quarantine 46
Pears—Grading Rules and Regulations and Law 38
Pearcy, Knight— Chestnuts 133
Potato—Tuber Moth 43
Powdery Scab—Quarantine 42
Prune, The—Robert C. Paulus 142
Prune, An All-Star Orchard—Earl Pearcy 143

Q

Quarantine Law, General 29
Quarantine Law, No. 1, Alfalfa Weavel 41
Quarantine Law, No. 2, Powdery Scab of Potato 42
Quarantine Law, No. 3, Tuber Moth of Potato 43
Quarantine Law, No. 4, White Pine Blister Disease 44
Quarantine Law No. 5, Alfalfa Weavel 45
Quarantine Law No. 6, Pear Thrips 46
Quarantine Law No. 7, Alfalfa Weavil, Malheur County 46
Quarantine Law, U. S. No. 26, White Pine Blister Disease, Malheur County 48
Quarantine Law, U. S. No. 37, Importation Nursery Stock 49
Quarantine Law, U. S. No. 38, Black Stem Rust 60
Quarantine Law, U. S. No. 40, Jappanese Beetle 62
Quarantine Law, U. S. No. 44, Oriental 65
Quarantine Law, U. S. No. 41, European Corn Borer 68
Quarantine Law, U. S. No. 43, European Corn Borer 70
Quarantine Law, U. S. No. 33, Gipsy Moth and Brown-tail Moth 73

R

Report of President—Chas. A. Park 7
Report of Commissioner—H. C. Atwell 10
Report of Commissioner—A. C. Albert 12
Report of Commissioner—T. A. Sammis, Jr. 15
Report of Commissioner—H. H. Weatherspoon 17
Report of State Inspector—J. E. Stansbery 21
Reynolds, L. T.—Cherries 98
Root, George A.—White Pine Blister Diseases 177
Rules and Regulations Governing Export Entry 78

S

Sammis, T. A., Jr.—Report 15
Sale of Lime-Sulphur Solution 35
Schimpf, W. E.—Cranberry Industry 163
Some Needs of Oregon Horticulture —Prof. C. I. Lewis 93
Specimens ..... —
Spray Calendar 83
Standard Lime-Sulphur Dilution Table 88
Standard Sizes of Apple Boxes 35
Stansbery, J. E.—Report 21
Strawberry Culture—W. H. Walton 162
Strawbery Root Weevil—Prof. A. L. Lovett 155
Strawberry Corn Borer—Prof. A. L. Lovett 160

T

Timber Moth—Potato—Quarantine.... 43
Trunk, Charles—Developing a Walnut Grove 130

U

Useful Tables 196

W

Walnut Grove, Developing—Charles Trunk 130
Walnuts, Importation of 141
Walton, W. H.—Strawberry Culture 162
Weatherspoon, H. H.—Report 17
Weatherspoon, H. H.—Apple Industry 124
White Pine Blister Disease—Quarantine 48
White Pine Blister Disease—Rook.... 177
Wilder Medal—Henry E. Dosch 91

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